

Chemical Week

synthetic organics ride a rougher road . . p. 42



**My wife's cooking
is out of this world . . . p. 29**

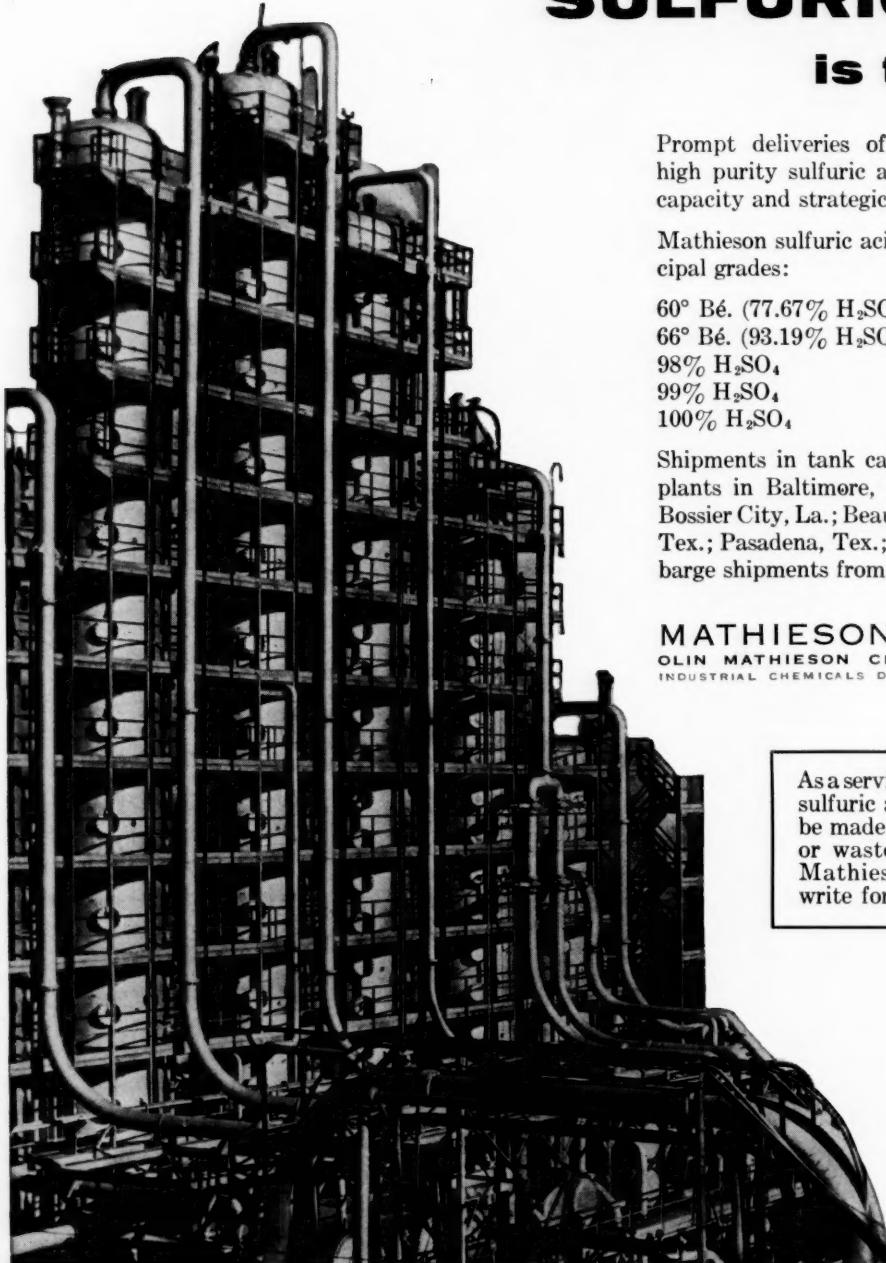
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**UNION
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Chemical Week

TOP OF THE WEEK

August 24, 1957

- **MCA moves to broaden aid-to-education program.** Association will try to get grade school students interested in science and engineering careers p. 23
- **Glutamic acid via fermentation?** Long-discussed process gets its first commercial tryout in Japan p. 37
- **Mutual Chemical makes chromyl chloride** with a novel process switch: It uses the product as reaction medium to make more product p. 39
- **American-Marietta diversifies into printing inks** via purchase of Sinclair & Valentine p. 61
- **Planned petrochemical expansion growth** overshadows projected spending figures for petroleum refining p. 82

8 OPINION

13 MEETINGS

17 BUSINESS NEWSLETTER

20 Chemical companies find pressing problems in racial tension. Here's how efforts to integrate white and Negro workers are progressing.

22 New England's prolonged drought hasn't yet affected any process industry firms.

Kaiser Aluminum and Chemical has run into a public relations poser at its Chalmette, La., plant location.

First leases on oil shale deposits on public lands will be approved soon in Utah.

Voting rights to 8% block of Allied Chemical stock may soon pass to Belgian firm.

23 Progress report on education. Here's how MCA's science-aid program is moving into the grade schools.

25 WASHINGTON NEWSLETTER

29 ADMINISTRATION

Process companies veer away from long-term borrowing following "prime rate" interest increase.

37 ENGINEERING

Manufacture of glutamic acid by fermentation gets full-scale tryout.

39 Key to Mutual Chemical's chromyl chloride process: use of product it-

self as reaction medium for making more product.

42 MARKETS

Production, sales, poundage and value of many synthetic organic chemicals didn't fare as well in '56 as in the boom year of '55.

51 RESEARCH

Westinghouse unveils "world's purest silicon," will license its manufacturing process to other U.S. companies.

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61 SPECIALTIES

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65 MARKET NEWSLETTER

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Chemical firms investigate use of standardized abbreviation system to fit today's use of mechanized accounting systems.

74 PRODUCTION

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82 CHARTING BUSINESS

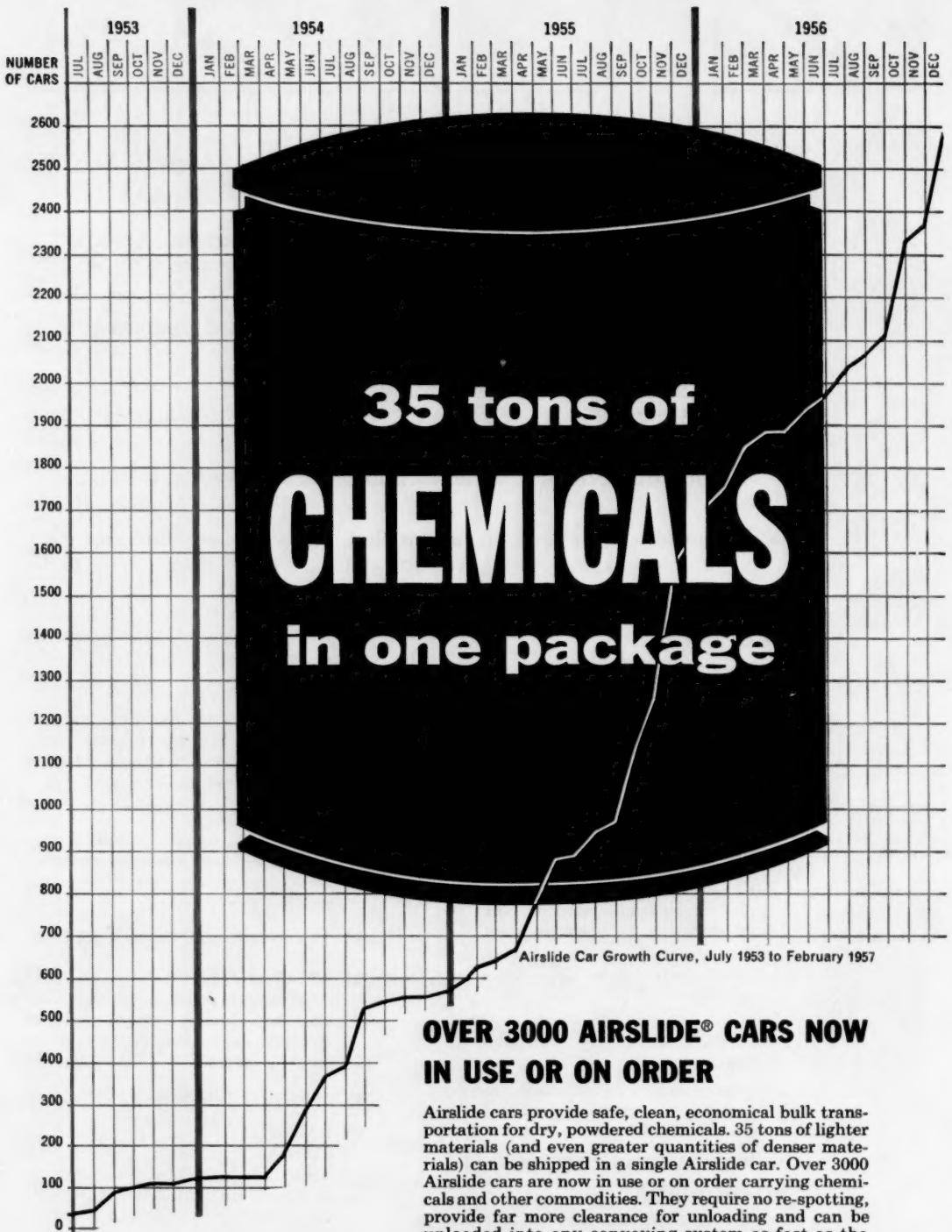
Big growth ahead in capital spending for petrochemical expansion.

Vol. 81

No. 8

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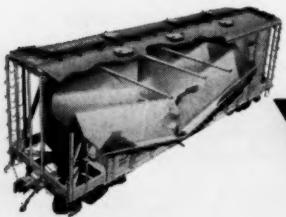
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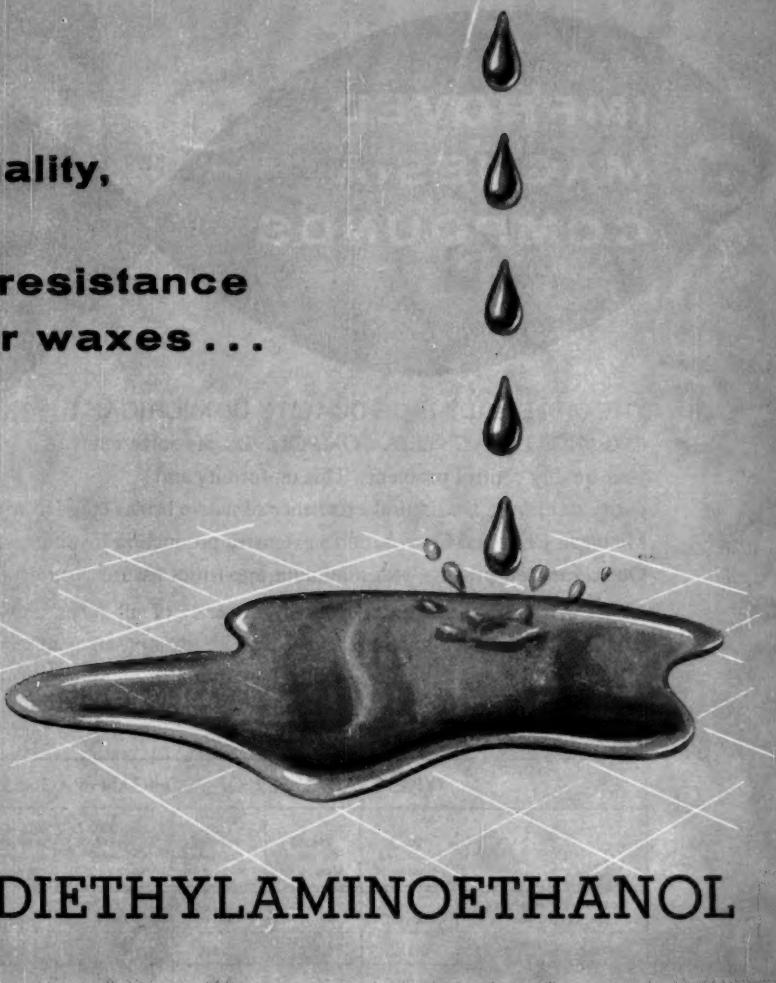
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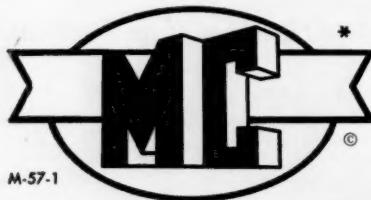
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Chloride (as Cl):	0.08	0.1	0.2	0.25	0.25	0.1		
Analysis, ignited basis:							PASSES N. F. X SPECIFICATIONS	
SiO ₂	0.3	0.3	0.3	0.3	0.3	0.15	N O T	0.20
Fe ₂ O ₃	0.2	0.2	0.2	0.2	0.2	0.08	I G N	0.15
Al ₂ O ₃	0.2	0.2	0.2	0.2	0.2	0.08	I G N I T E D	0.15
CaO	1.0	1.0	1.0	1.0	1.0	0.7		0.7
Mn				0.01	0.01	0.00	D	
Free Moisture						1.5		2.0
Screen test: Through 200 mesh			95%		99.9%	99.9%	99.0%	99.0%
Screen test: Through 325 mesh				99.5%	99.5%	99.5%		



M-57-1

*Reg. U. S. Pat. Off.

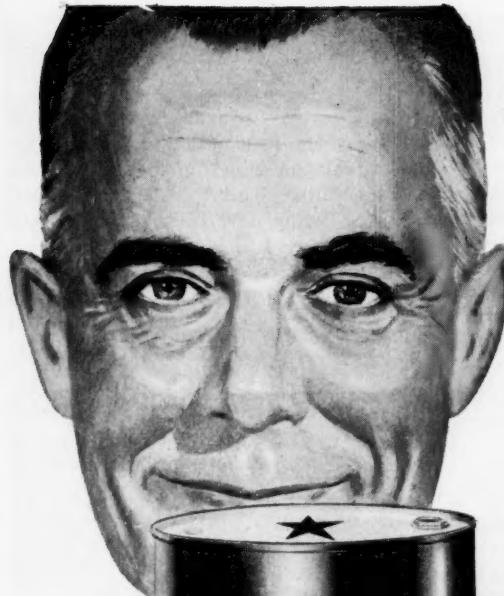
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OPINION

TMP, TME: Trademarks

TO THE EDITOR: We refer to the article, "A Growing Team of Polyols" (July 27). This article discusses certain recent developments in the production and sale of trimethylolpropane and trimethylolethane. Those chemicals are referred to in the article on several occasions as TMP and TME.

TMP and TME are the registered trademarks of Heyden Newport Chemical Corp. for trimethylolpropane and trimethylolethane, respectively. . . .

In addition to making continuing use of those trademarks, we have publicized [them] in various media. . . .

D. CAMERON POND

Patent Counsel

Heyden Newport Chemical Corp.
New York

Laboratory. The package used to illustrate your article contains Ritter Sealaromes, and for that reason I believe the pioneer producer of powdered flavors in the U. S. should not have been overlooked in your article.

M. H. BAKER
M. H. Baker Co.
Minneapolis

NPFI and Potash

TO THE EDITOR: This refers to the article (July 20) titled "Feud Splits Fertilizer Ranks."

Certainly, there is no "feud" between the six potash producers who are resigning from this organization and the other members of the National Plant Food Institute. All are concerned, however, by the disagreement between these potash producers and other members of the National Plant Food Institute as to how the dues structure should be set up to finance the institute's expanded program. Careful study is now being given to how, if inequity does exist, this may satisfactorily be resolved. There is no disagreement between the potash companies and other members of the National Plant Food Institute about the program itself.

Your article indicated that the National Plant Food Institute budget is allocated as to the amount of funds to be spent in the promotion of potash products (and this would imply allocations for other elements). The budget does not, and could not, contain such allocations. The promotional efforts of this organization are directed toward increasing the use of all fertilizers in accordance with recommendations of state agricultural experiment stations and the

Cobalt-60 in L. I. City

TO THE EDITOR: We should like to invite your attention to an omission in your article, "Radiation for Rent" (June 22, p. 74).

In January of this year, Radiation Applications Inc. opened the RAI Industrial Radiation Center at 42-40 Crescent St., Long Island City, containing the first privately owned cobalt-60 source of radiation in the New York area regularly available to industry for commercial research and development. Complete with supporting laboratory facilities, the center is now being utilized by industry for gamma radiation on both a service and a contract basis. The base charge is \$8 per hour with continuous 24-hour use available for \$64.

MUNROE F. POFCHER
President
Radiation Applications Inc.
New York

Pioneer Flavorer

TO THE EDITOR: Dr. Alexander Katz, of F. Ritter & Co., ever a pioneer in broadening the perspectives of the American flavor-producing industry, had us offering his powdered-flavor Sealaromes to producers of food, feedstuffs, pharmaceutical and confectionary products in early 1952. These were not entirely new then and were based, I believe, on work originally done at USDA's Western Regional Research

CW welcomes expression of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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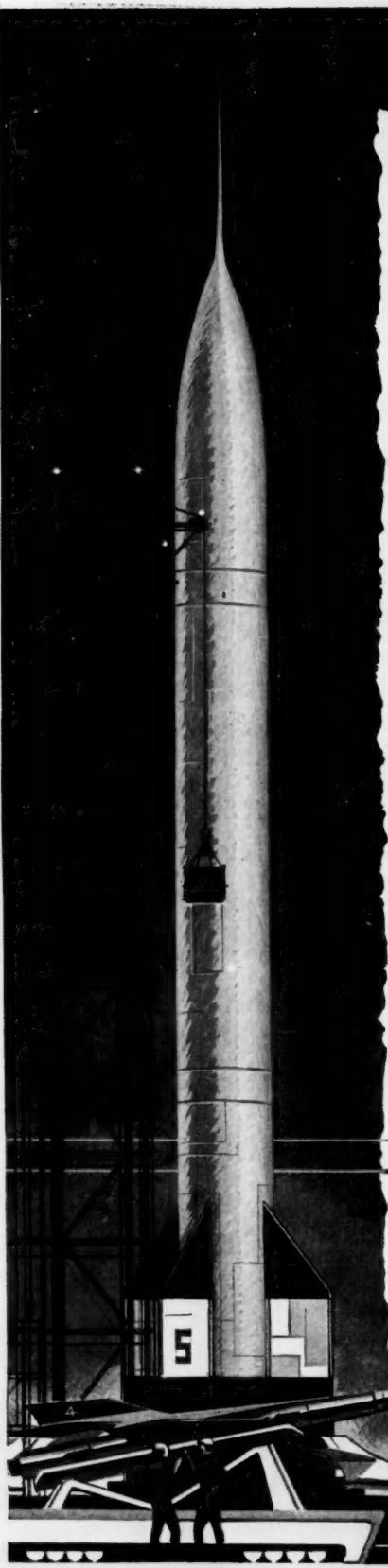


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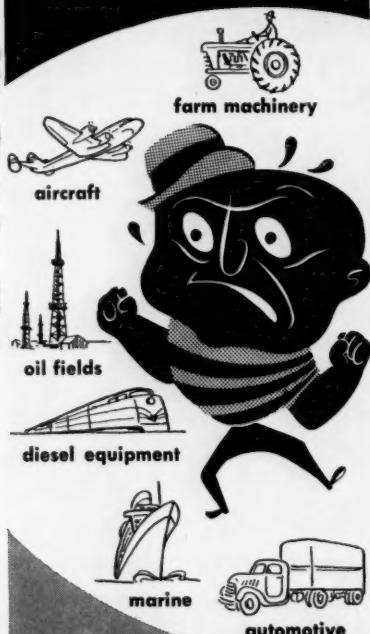


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OPINION

U. S. Dept. of Agriculture. The relative amounts of nitrogen, phosphate and potash recommended by state experiment stations vary by crop, by soil, and by climatic conditions. The determination as to grades of fertilizer or of fertilizer materials recommended is never made by the National Plant Food Institute.

We believe the expanded program now being launched will benefit all segments of the fertilizer industry and, quite importantly, that it will make a substantial contribution to the welfare of agriculture throughout the nation.

PAUL T. TRUITT
Executive Vice-President
National Plant Food Institute
Washington, D. C.

We're glad to publish NPFI's views. But there is precious little difference, in our opinion, between Reader Truit's "disagreement" and CW's "feud."—ED.

Lower Ratio

TO THE EDITOR: In the last column of sales and earnings table (CW, Aug. 10, p. 20) labeled "Ratio, net to sales, 1st 6 mos. '56 (percent)," the figure for Union Carbide should be 11.4 instead of 33.0. It looks as though the figures for Union Carbide and Texas Gulf Sulphur were transposed.

E. W. AXTHELM
Manager Public and Stockholder
Relations Division
Public Relations Dept.
Union Carbide Corp.
New York

They were.—ED.

Trading with Communists

TO THE EDITOR: Reference is made to the article "Will Canada Take the Jump?" (CW, Aug. 3, p. 40) that discusses the question of Canadian trade with Communist China. In considering this question, the article indicates that it may be possible for Canadian subsidiaries of U. S. firms to ship certain chemicals to Communist China.

Your attention is invited to the fact that this government is continuing its total embargo on all exports to, imports from, and financial transactions with Communist China and North Korea. Foreign assets control regula-

tions, issued by the Treasury Dept. under authority of the Trading with the Enemy Act, relate to commercial and financial transactions with designated foreign countries (Communist China and North Korea) and nationals thereof. These regulations are applicable to all persons subject to the jurisdiction of the United States. The regulations prohibit direct or indirect transactions by the parent firm in the U. S. involving Communist China or North Korea or nationals thereof in the absence of a Treasury license. The prohibition against indirect transactions by the parent firm is interpreted to mean that the parent firm may not permit subsidiaries located abroad to trade with Communist China or North Korea or nationals thereof regardless of whether the goods involved are produced in the U. S. or abroad. Accordingly, persons subject to the jurisdiction of the United States [government] may not through their foreign subsidiaries engage in commercial or financial transactions involving Communist China or North Korea or nationals thereof in the absence of a Treasury license. Licenses would not normally be granted for any shipment to designated foreign countries, regardless of the origin of the merchandise and whether the goods are strategic or nonstrategic.

You may wish to call the foregoing to the attention of your readers who might otherwise unintentionally engage in transactions prohibited by the cited regulations.

EDWIN F. RAINS
Acting Director
Foreign Assets Control
Office of General Counsel
Treasury Dept.
Washington, D. C.

Charts in New Spot

TO THE EDITOR: On receiving CHEMICAL WEEK, I invariably flip through the pages until I come to "Charting Business." I've always found it entertaining as well as an invaluable source of pertinent information concerning the chemical process industries.

In the issue just received (Aug. 10), however, you crossed me up. I found the yellow page on which Charting Business usually appears, but was surprised to see the space occupied with Washington Newslet-

ter and Business Indicators. Then, rather than thumb through the magazine, I looked on the contents page—and found no Charting Business listed. . . .

For the sake of all, if you decide to change its location again, let your readers know about it. . . .

J. L. CLEVELAND
Buffalo, N. Y.

We slipped up on the contents page. Hereafter, "Charting Business" will appear weekly on the last page inside the back cover.—ED.

Ilford for Amateurs

TO THE EDITOR: The story (*July 13*) titled "Selling Photo Film: Where 42 Million Amateurs are King" was an excellent piece and, with one exception, gives a good and concise account of the world film situation.

The single exception of which I am aware is the failure to report that Ilford Ltd. has for more than a year been operating a subsidiary company in this country—Ilford Inc., at 37 West 65th St. in New York. This subsidiary company is the sales and distribution headquarters for the entire line of Ilford photographic materials in the United States. A sales staff has been established to cover the entire country.

Basically Ilford Inc. is concentrating on the graphic arts, commercial-industrial, medical and industrial, X-ray and nuclear emulsion fields. However, sales of black-and-white roll and sheet film to the amateur field are steadily growing. . . .

FRANK H. OTWELL
Account Executive—Publicity
Fuller & Smith & Ross Inc.
New York

Our emphasis, as the headline indicated, was on amateur film. Ilford was included implicitly in the sentence, "The bigger European film makers are also selling film in the U.S., but on a limited scale."—ED.

Not All Scouts

TO THE EDITOR: Your story "New Buildup on Windy City's Waterways" (*CW*, Aug. 3, p. 30) is a very fine article and gives a considerable amount of information about the position of the Chicagoland area in the chemical industry and other allied industries . . . there are listed among the 154 industries located on the Chicagoland

waterways, quite a number of industries that have a large interest in the chemical business, both processing and distribution, and in serving those in the chemical industry.

You mention in your article that there were 172 site scouts on board, but that does not seem to be the case, for the reason that there were many on board who were already in business on the waterways, or had operations in our terminal or other terminals, and others interested in the great development of the Calumet-Sag project and also the Lake Calumet Harbor, and did not primarily go along for the purpose of seeking a site.

ABRAHAM FELDMAN
President
Lake-River Terminals Inc.
Berwyn, Ill.

MEETINGS

American Soybean Assn. and National Soybean Processors Assn., annual meeting, Leamington Hotel, Minneapolis, Aug. 26-28.

Fisk University, 8th annual infrared spectroscopy institute, Nashville, Aug. 26-30.

Instrument Society of America, international symposium on gas chromatography, Kellogg Center for Continuing Education, East Lansing, Mich., Aug. 28-30.

National Agricultural Chemicals Assn., 24th annual meeting; theme: relations of marketing problems to progress in the agricultural chemical industry; The Essex and Sussex, Spring Lake, N. J., Sept. 4-6.

Instrument Society of America, 12th annual instrument automation conference and exhibit, Auditorium, Cleveland, Sept. 9-13.

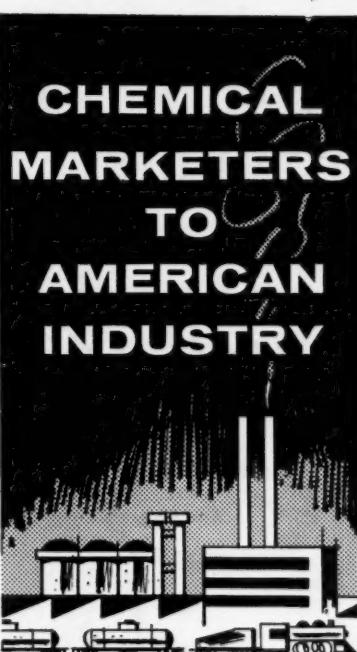
Society of Photographic Scientists and Engineers, conference, Berkeley-Carteret Hotel, Asbury Park, N. J., Sept. 9-13.

American Chemical Society, 132nd national meeting, New York, Sept. 10-12.

Technical Assn. of the Pulp and Paper Industry, testing conference, Hotel Shoreham, Washington, Sept. 11-13.

Chemical Market Research Assn., annual resort meeting; theme: impact of St. Lawrence Seaway on chemical industry; Lake Placid Club, Lake Placid, N. Y., Sept. 15-17.

Canadian Agricultural Chemicals Assn., 5th annual meeting; theme: safety and health; Mont Tremblant Lodge, Quebec, Canada, Sept. 15-18.



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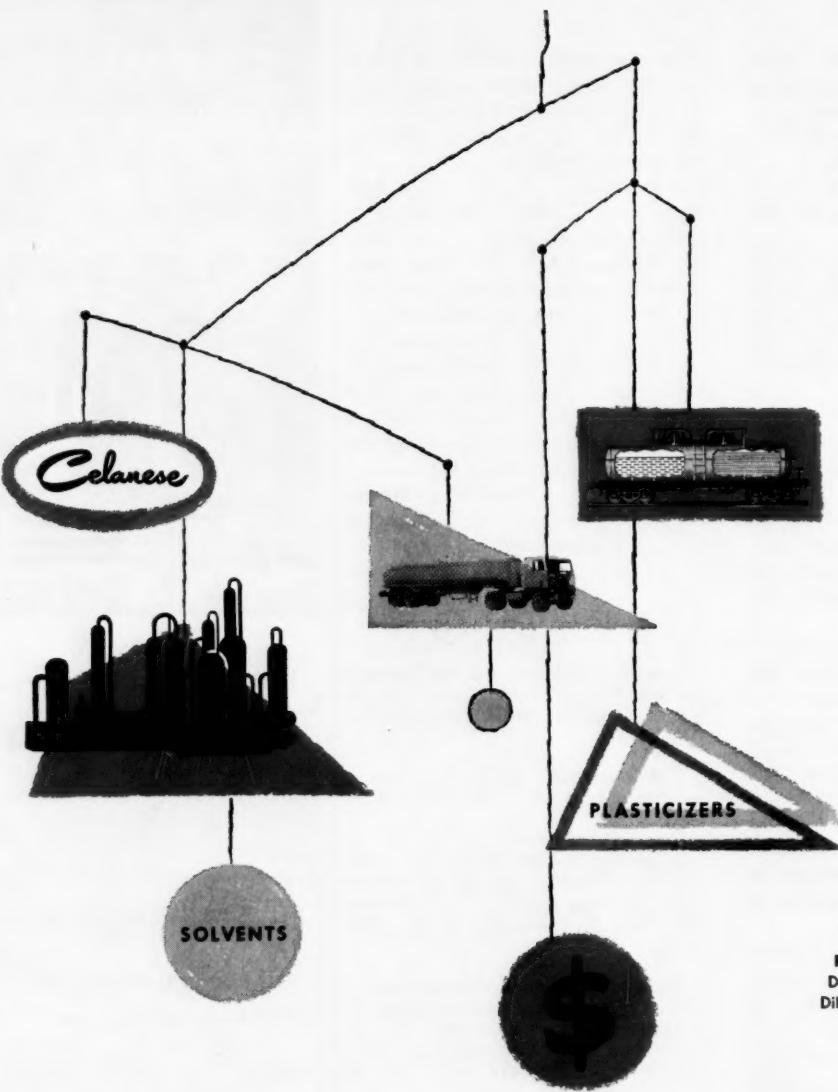
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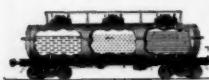
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AUGUST 24, 1957

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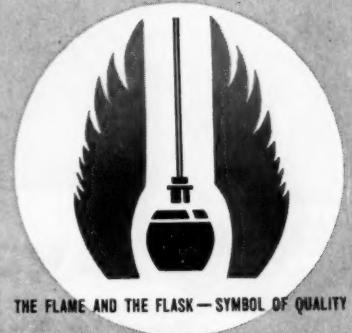
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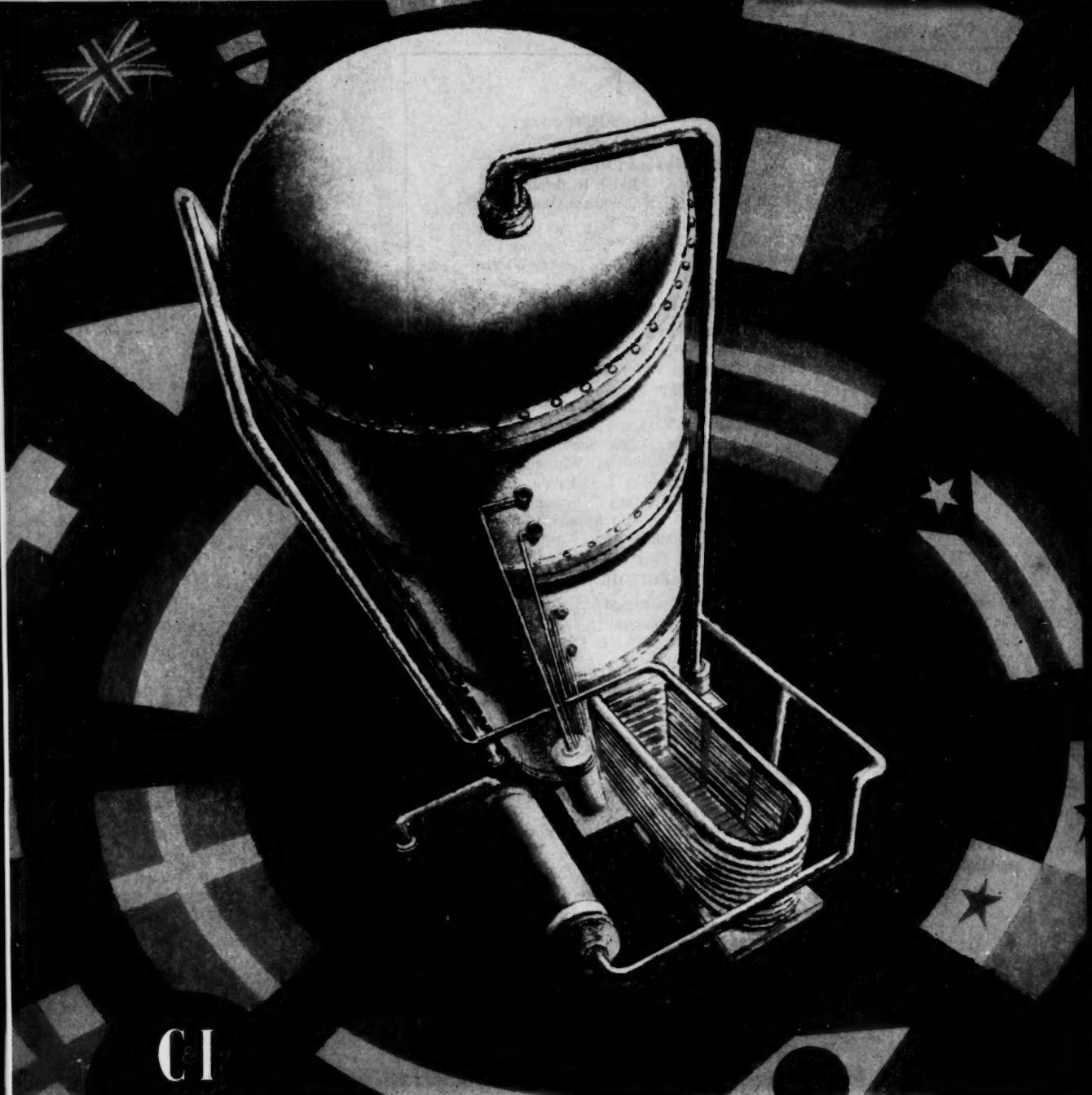
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Business Newsletter

CHEMICAL WEEK
August 24, 1957

First shipments of Asiatic flu vaccine left drug plants last week, well ahead of schedule. Both Lederle and National Drug air-shipped a preliminary supply of the vaccine to major U. S. cities, for vaccination of "persons who perform essential work, including care of the sick."

Six companies—Eli Lilly, Lederle, Pitman-Moore, National Drug, Merck and Parke, Davis are manufacturing the vaccine (*CW, June 20, p. 24*). Early September was the original target date to have it available in quantity. National and Lederle were able to ship some 140,000 inoculations to civilian outlets that were made on order for the armed services but which did not receive the military's O.K. (because of a delay in procedure, rather than a flaw in the vaccine). It had been accepted by the Public Health Service.

Vaccine shipped last week, as well as that expected from other drugmakers in the next few weeks, is to be distributed to states on the basis of population. In addition to the vaccine, output of antibiotics is being stepped up, in order to have ample supplies to fight possible secondary infections (*see also Market Newsletter, p. 66*). Already, some 20,000 cases of the flu have been reported by the Surgeon General of the U. S.

Memo on mergers and proposed mergers:

- Schering Corp. and White Laboratories will merge if stockholders of both firms, who will meet Sept. 19, agree on the proposal already okayed by directors of both companies. Under the proposal, the 2.25 million authorized shares of Schering common would be converted into 6 million new common shares; and a new, 278,983-share issue of a preferred stock would be created. White Laboratories' shareholders would then get 1½ shares of the new Schering common plus one share of the newly created preferred stock for each share of White Laboratories' Class A and B common (of which 274,593 shares are outstanding). Schering, with annual sales of around \$54 million, makes both ethical and proprietary products, and veterinary medicine; White and its subsidiary, Pharmacopeia, Inc., also produce both ethicals and proprietaries, with annual sales of about \$12 million.

- American-Marietta added another new division this week: Booty Resineers, Inc. (Newark, O.), just after it ventured into printing inks with the purchase of Sinclair Valentine (*see also p. 61*). Booty, acquired through an exchange of shares, makes synthetic resins for adhesives, laminating and molding compounds, and textile finishes.

- **Victor Chemical enlarged its phosphate interests** last week with the acquisition of the phosphate ore washing plant of Federal Chemical Co. It also took over 2,700 acres of phosphate lands owned by Federal near Mount Pleasant, Tenn.

Business

Newsletter

(Continued)

National Petro-Chemicals Corp. is adding 75 million lbs./year to its polyethylene resins capacity. National, managed by U. S. Industrial Chemicals Division of National Distillers, and jointly owned by USI and Panhandle Eastern Pipeline Co., already had 100-million-lbs./year capacity at Tuscola, Ill. The new, \$20-\$25-million unit will likely be constructed in the Gulf Coast area. Lake Charles, La., and Port Neches, Texas, are currently the favored locations, although location is not settled yet. Jefferson Chemical or Petroleum Chemicals, Inc., may supply the ethylene.

The new plant will use a modified, high-pressure process similar to that already in operation at Tuscola. Due onstream in late '58, the plant may also produce propylene butylene polymers.

Low-pressure polyethylene, too, is in National's plans. It will construct a 25-lbs./day low-pressure pilot plant shortly, will work with both the Ziegler and the Phillips processes. National will conduct research with polymerization catalysts it has developed that it feels may be superior to those currently in use.

USI also confirmed that it will build a polyvinyl chloride plant. It has had, in the past, chlorine available at its Ashtabula plant, and access to acetylene from the Electromet unit there (*CW, July 3, '54, p. 43*). But USI is seeking a partner for the venture, and most likely candidate now seems to be Mastic Tile, Inc. (Newburgh, N. Y.). USI says it has not yet made a firm agreement on any partner, and Mastic Tile's president, Seymour Milstein, says "no comment."

Management can expect "business as usual" in dealing with Oil, Chemical & Atomic Workers Union (AFL-CIO) over the coming year.

Delegates to OCAW's annual meeting in Chicago last week were in a stand-pat mood, re-electing all four incumbent officers and refusing to alter their constitution. They did pass three resolutions important to management:

- One on automation calls for a shorter work week, guaranteed annual wages, retraining programs, adequate transfer and relocation policies.
- On multiplant bargaining, the resolution calls for supporting and fostering company-wide and subcompany-wide councils.
- On atomic energy, OCAW seeks a "crash" program by the Atomic Energy Commission for power reactor development and construction; stepped-up research and investment by private industry in non-power aspects of nuclear energy; Congress-established safety codes.

Radioactive antimony added to dynamite is the latest safety measure taken by Canada's federal mines department. Miners handling dynamite can thus use geiger counters to locate unexploded sticks.

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CW 8-24-57

August 24, 1957



Negro workers, long submerged among white workers, are finding better jobs as process firms seek to

Brighter Opportunities Dawning for the

By last week, it was plain that civil rights legislation was having its troubles in the U.S. Congress. But it was also plain that the Administration's stand in support of equal rights for all workers was to be strengthened—and informed chemical management saw Vice-President Nixon's plan for tougher enforcement of antidiscrimination clauses in government contracts as the means to this end (CW Washington Newsletter, Aug. 10).

To the chemical process industries, civil rights is important because race problems can affect plant location and efficiency of labor. Aware that pressures for integration are sure to increase, more firms are seeking to accurately determine the precise nature of regional race problems, the best ways to bring about integration of Negroes into plant operations.

While the equal-rights clause in government contracts has teeth (the government can cancel a contract made with a firm violating this clause), it is just one of several factors that have made chemical firms more receptive to integration.

Goodwill at Contract Time: One potent factor has been the desire—by both management and unions—for the goodwill of the Negro worker at contract time. Result: a fairly general trend to include a Negro on unions' contract negotiating committees. Management, too, often presses for a Negro on contract-negotiating panels, to gain Negro confidence—and a block of worker votes.

Where only ten years ago, it was rare indeed to find a Negro negotiator, the situation is quite different today. Still, CW's study shows, the Negro

work force is not fully represented in proportion to its size.

Higher on the Ladder: The plain need for competent help has pushed some firms into the first hesitant steps toward integration, and this is a factor likely to be of increasing weight if a technical-manpower shortage persists. For the most part, employment of Negro Ph.Ds has been concentrated in Northern companies. But even in semi-South states such as West Virginia, Missouri and Delaware, a few Negroes have been taken on. Though instances are rare, some top Negro technical help has even been employed in plants in North and South Carolina, Georgia and Louisiana.

Success of these ventures is a strong selling point for the prointegrationists.

Other powerful contributors to the acceptance of Negroes in jobs pre-



WIDE WORLD

Tap the potential of this work force.

Negro Worker

viously restricted to whites have been special Negro organizations such as the National Urban League and the National Assn. for the Advancement of Colored People. Such groups keep large lists of Negroes seeking jobs, and by getting positions for them alongside whites, they hope to speed integration at all levels.

Preliminary Steps: In many instances, the opening wedge for integration is small. For example, a firm hires Negro secretaries—who are unlikely to cause resentment among workers.

If such a move works out all right—and it's never taken without consulting top management, supervisors, and in some cases, the white workers themselves—other Negroes are hired.

In segregated areas, adding of Negro help is sometimes followed by

the unobtrusive removal of "white" and "colored" signs over water fountains, recreation rooms and the like. Says one Texas firm: "At one time the fountains around the plant had signs 'white' and 'colored.' As the original fountains were replaced one by one, the signs were not repainted. Now, everyone in the plant uses the same drinking fountains."

Another step is to get whites and Negroes to use the same rest rooms. One firm did this by building identical washroom for whites and Negroes—at opposite ends of the plant. When white workers had to use the rest rooms—and didn't want to walk the length of the plant—they would sometimes slip into the nearest one, even though it was often marked "colored." Eventually, the reverse occurred, soon the signs were removed.

Getting Ahead: The chance for a Negro to get promoted to a better job is still not too good in many areas, many firms admit. One chemical company with many large plants in the South told *CW*, "We'll hire colored technicians for our plants; all they have to do is apply—and they'll have the chance to advance, too." But so far, the company has no Negroes in technical jobs, although it says it plans to very soon.

The traditional separate Negro and white seniority lists that have kept Negroes chiefly in menial jobs are coming under pressure. Largely at the urging of the President's Committee on Government Contracts—headed by Nixon—Esso's petroleum refinery at Baton Rouge, La., and Shell's refinery at Houston, Tex., have abandoned their separate listings. But this step is yet to be taken at a number of other Southern refineries.

Expansion South: While some companies have been contracting on

facing integration problems before the law forces them to, others seem to try to avoid the whole issue. There have been a few companies that have killed plans to build in the South to avoid settling in racial trouble spots (very few chemical firms fall into this category).

For example, a representative of one chemical firm was reported by a newspaper to have recommended that a certain small Alabama town was an excellent site for a new plant. But, the paper went on, he changed his mind when he found Ku Klux Klan literature tucked under his car's windshield wiper the next morning. The chemical firm involved told *CW* that the story "was not exactly true . . . was written by the paper for local consumption."

Another firm, a Detroit plastics maker, was reportedly investigating a Southern city with the idea of building a plant there. But when the firm's representative told local officials he was going to hire Negro engineers only, his bid for land was politely refused. Town officials felt the company was seeking national publicity, not equal rights for Negroes.

While there may be some genuine instances of expansion plans being halted in racial trouble spots, most chemical firms feel the problem has been greatly overstated. Without exception, chemical executives interviewed didn't believe racial tensions will cause any changes in expansion plans. Most agree that potential race troubles can't outweigh factors like climate, water availability, price of power, and other economic incentives in locating plants.

Unlike these other location-determining factors, the problems created by racial differences are artificial, and can be solved.

How Southern Industry Uses the Negro*

	In Chemical Plants	In All Others
Negro employees	6.3%	7.8%
Negroes in supervisory jobs	0.1	0.5
In technical jobs	0.4	0.3
In skilled jobs	6.9	14.6
In semiskilled jobs	31.5	23.4
In unskilled jobs	69.2	46.3

*Data covers 265 plants in 16 Southern states.

Source: National Urban League report, limited to Southern states.



WIDE WORLD

Stunted crops are stark testimony to severe drought.

Industry Weathers Drought

The near-record-breaking drought that has stunted crops in dry areas from Virginia through New England has not caused trouble for most chemical process plants, a CW survey this week shows. Surface-water levels are low in some areas, but not generally threatening.

There are exceptions, of course. In Millinocket, Me., Great Northern Paper Co. has cut production because reservoir water used for electric power is extremely low. And in Montville, Conn., an Allied Chemical concrete plant is hauling water for wet-dust collectors because the plant's pond and wells have dried up.

In New Jersey, some communities report pumping trouble—expected to ease off with fall rains. In Delaware, continued low precipitation could pinch drinking-water reserves before fall.

Generally, however, the larger streams throughout the Northeast are well above the record minimums, says the U.S. Geological Survey.

Salinity in some streams is high. In the Delaware River, at Camden, N.J., sodium chloride content is up to 52 ppm. (normally 2.8 ppm.).

More significant for chemical plants is that ground water, generally, and deep wells, in particular, are at healthy levels. Most of them would stay that way through years of drought, industry people say.

But drought-raised dust has smoothed markets. Stauffer Chemical Co. says that crop losses have dried up fertilizer demand and that fungicide needs are also dropping with the water level.

Old War, New Battle

The pitfalls of site procurement were vividly demonstrated last week when Kaiser Aluminum & Chemical reached an impasse with a Louisiana historical society over the request that the company donate land to a national park.

The hassle arose some weeks ago when the Louisiana historic landmarks council asked Kaiser to donate 66 acres adjacent to its Chalmette, La., plant, for expansion of a national cemetery and park. Kaiser bought the land several years ago to provide for expansion of the plant. The firm's board of directors has refused to donate the land, although it has offered to exchange it for suitable property nearby.

But the landmarks council says it can't afford to provide such an exchange, plans to appeal to the U.S. Dept. of Interior, the American Legion and the Veterans of Foreign Wars for help. The council claims that erection of a Kaiser plant adjacent to the War of 1812 battleground site would be a "desecration" and would ". . . outrage the American people."

New Voter at Allied?

Voting control of the largest single block of Allied Chemical's outstanding common stock may soon pass to foreign hands. That's the outlook resulting from Solvay American Corp.'s application last week to be declared no longer in business as an investment firm.

Solvay American, an investment firm, has for several years held about 8% of Allied's common in a trust voted by the First National City Bank of New York. Last March, Solvay American was merged into its parent investment firm, North American Solvay Inc., a U.S. investing subsidiary of the Belgian chemical company Solvay et Cie. The 10-year voting trust, as a result, is due to be dissolved and stock turned back to owners this October.

With the dissolution, voting privileges of the stock interest, which was recently increased to 13%, are expected to pass directly into the hands of North American Solvay, and thus, to its Belgian parent. How this interest would be used has not yet become clear; officials of North American Solvay were unavailable last week for comment.

Allied Chemical officials, however, say they anticipate no efforts by North American or Solvay et Cie to seat directors or influence company operating policy.

First Shale Leases

The first leases of oil shale lands to be issued by a state government appear ready this week in Utah. The leases will go—albeit indirectly—to National Farmers Union (Denver, Colo.) for shale oil research, development of lands in Uintah County, Utah.

The Utah state land board, after hearings at Salt Lake City last week, indicated its willingness to lease 16,000 acres to Ben, Ernest and J. A. Olsen, who, in turn, have an agreement with NFU. The board appears to be agreeable to an arrangement under which a 5% royalty would be paid to the state for 10 years.

Charles Brannan, former U. S. Secy. of Agriculture, and counsel to NFU, says the organization will launch research on mining and retorting of the shale. It would seek a partner for any commercial venture.

MCA Bids for New Scientists

The Manufacturing Chemists' Assn. this week launches a new campaign aimed at attracting young people into science and industry—through its aid-to-education program.

The latest step in the trade group's industry-supported drive to make chemistry and other sciences more interesting to high school science students, it is a series of more than 30 so-called "open end" laboratory experiments.

Without charge, MCA is providing high school chemistry departments with detailed instructions on these experiments, which are designed to develop students' abilities to answer the "why" of certain reactions, rather than the "how." Example: The student coagulates latex into a rubber sheet, and observes it under application of heat—unlike most substances, it contracts, and the student is asked to work out his own explanation of why.

Pilot Tries: MCA has already tried out some of these experiments on a pilot basis in schools around the nation. The response, says the association, is "enthusiastic."

This, of course, is just what MCA wants, and it has prepared a \$100,000 budget for the program for the coming school year. The MCA's older junior high school general science experiment program received a \$40,000 budget this year.

Experimental Panel: Directing the new program is William E. Chace, MCA's educational director, and a man with a background in such diverse fields as journalism, education, public relations, advertising and history.

To help him work out the experiments, MCA brought in Elbert C. Weaver, textbook author and chemistry instructor at Phillips Academy in Andover, Mass., and James K. Hunt, of Du Pont. Experiments were checked by a panel of chemical educators, and tested in industry labs for their practical value.

Overseeing the entire program is the association's 22-man industry-advisory committee headed by Du Pont's Glenn Perry and American Cyanamid's Robert Fiske.

More to Come: MCA this week issued mailings explaining the high school program to some 55,000 high

schools, boards of education and teachers. It offers to provide the series of 30 experiments free, others at cost. Later, it hopes to add to the package films showing more difficult experiments.

Chace admits that experiments will make more work for busy teachers, as well as for students. He says the only objection to last year's junior high school series was that they were time-consuming. To ease this situation, MCA is sending out instruction sheets to both students and teachers to familiarize them with the series before the experiments are actually worked. Chace feels this procedure can cut working time in half.

In addition to the high school and junior high school programs, MCA has budgeted some \$250,000 for a group of programs designed to foster interest in science:

- Awards, up to \$1,000, to outstanding college-level instructors.
- Community education programs—in which local chemical industry leaders take part.

Ahead is a program to expand the science experiment program down to the elementary school level.

These programs, MCA points out, promote the over-all chemical industry, not any particular product or manufacturer. Still, MCA reports, it hasn't had one turndown in rounding up support from industry.

FOREIGN

Polyvinyl Chloride/Poland: First stage of construction of a new polyvinyl chloride plant in Auschwitz (Oswiecim), Poland, is complete, and production will reportedly start in September. By 1958, capacity will rise to 13,000 tons/year.

Reichhold/France: Reichhold-Beckacite S.A., French affiliate of Reichhold Chemicals (White Plains, N. Y.), has placed 8,000 shares of common stock on the Paris Bourse. The offering was made to encourage company ownership by nationals in countries where RCI operates.

Expansion/Argentina: Du Pont has received Argentine permission to

spend \$220,000 to expand cellophane manufacturing at Ducilo SAIC (a partly owned subsidiary).

Another go-ahead went to Olin Mathieson Chemical Corp. for a \$9,074 investment in its Argentine arm, E. R. Squibb & Sons Argentina S. A. The money will go into equipment for weighing and packing powdered medicinals.

Oil/Philippines: The Philippine Cabinet has approved Standard Vacuum Oil Co.'s plans to build a \$35-million, 25,000-bbls./day refinery on Bataan.

EXPANSION

Glass Fiber: LOF Glass Fibers Co. will build a glass-textile yarn plant at Laurens, S.C.

Alkyl Amines: American Alcolac Corp. is installing equipment for production of alkyl amines at its Baltimore, Md., plant.

Chlorine-Caustic: Dow Chemical of Canada, Ltd., plans a \$650,000 chlorine-caustic soda expansion at its Sarnia, Ont., plant.

COMPANIES

National Cylinder Gas Co. will sell \$17.5 million of 20-year subordinated convertible debentures. The company will use the proceeds to complete its five-year expansion program in three years.

Olin Mathieson Chemical Corp. stock has been acquired by Prudential Insurance Co. Prudential held warrants on 100,000 shares (\$36.36/share) through ownership of \$175 million of Olin long-term notes. Olin has 13 million shares outstanding.

Kaiser Aluminum & Chemical Corp. has placed \$50 million of 30-year, 5½% first-mortgage bonds with institutional investors. Proceeds will be used to finance expansion.

International Glass Corp. (Culver City, Calif.) and Cascade Research Corp. (Los Gatos, Calif.) plan to merge, subject to International stockholders' approval. Terms call for exchange of stock.



HOW

HERCULES

HELPS...

WITH PENTAERYTHRITOL. Outstanding resistance to heat, to light, and to moisture have made PE-based alkyd resins the preferred approach to many of the newest developments in surface coatings. Other applications for this new chemical—in such things as vinyl plastics, fire-retardant paints, and floor coverings—are growing rapidly. The demand for PE has skyrocketed. And Hercules, with a new Midwest producing plant, is assuring ample room for even further product developments.

WITH PLASTICS. The first commercial plant utilizing the famed Ziegler process is now on stream in Parlin, N. J. producing Hi-fax®. This completely new Hercules ethylene polymer offers a combination of characteristics never before available in any plastic. The panel board below displays some of the superior housewares made with Hi-fax. Providing many advantages over conventional polyethylene, Hi-fax is already finding other applications in a wide variety of products.



HERCULES

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CHEMICAL MATERIALS FOR INDUSTRY



Washington Newsletter

CHEMICAL WEEK
August 24, 1957

Tougher federal action to force water pollution abatement is ahead. The U.S. Public Health Service's program to enforce provisions of the Water Pollution Control Act of 1956 (which covers pollution of waters that cross state lines) is moving into high gear. Where USPHS has so far given cleanup ultimatums only to small city and rural stream polluters, it has conditions in more than a score of other localities—including several with chemical plants—under surveillance.

City and industrial officials in two large chemical centers will soon be asked to confer with federal officers to set deadlines for curbing water pollution, and to study remedial action. The Public Health Service wants signed pledges from companies promising needed improvements.

Joint industry-municipal cleanup agreements have been volunteered as a result of these conferences. (Of course, if agreements weren't reached voluntarily, USPHS could obtain court orders to force pollution abatement.) In St. Joseph, Mo., Lederle Labs, Swift and Armour are among companies that are financing a \$6-million treatment plant for industrial wastes. In Omaha, Neb., a similar \$23-million project will get under way soon. A conference to discuss Potomac River pollution was slated for this week (Wednesday and Thursday) at Charlottesville, Va.

A program to assure good water supplies for Southwest industry and municipalities is also being undertaken by Public Health Service. Its engineers are looking into water quality of the Red and Arkansas rivers. They hope to come up with preliminary findings by Dec. 31.

This could ultimately lead to enforcement crackdowns if industrial wastes are found contributing to present river pollution. Southwest municipalities charge that brines discharged from oil fields account for most of the rivers' high salinity, but oilmen counter that most of the salinity is from natural causes. PHS hopes to nail down how much of the salinity and other pollution is man-made.

Insurance of future water supply figures prominently in the service's intervention. It notes that Dallas and other distant users are starting to tap these big rivers for essential water supply as nearby sources dry up. And officials see this trend increasing—with many more industrialized areas laying pipelines to the big rivers in order to keep going. With the area's industrial and municipal growth—if not survival—becoming more dependent on the two big rivers, PHS figures there's no time to waste in taking steps to improve their water quality.

Getting the government out of business got a lift last week as the Justice Dept. cleared the last barrier to selling the Akron rubber research labs to Firestone Tire & Rubber Co. The sale—for \$760,000 cash

Washington Newsletter

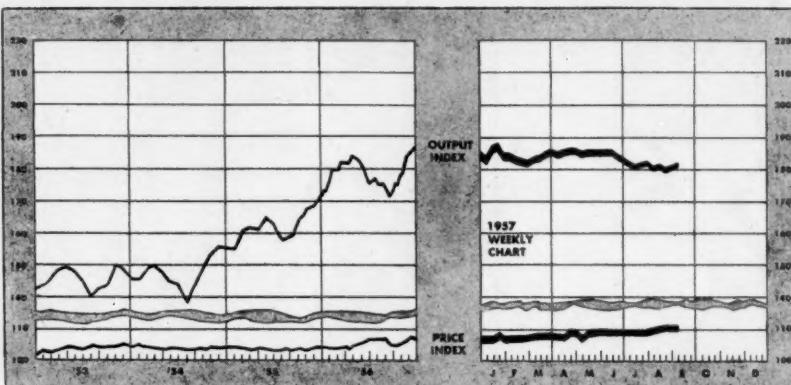
(Continued)

—is significant because Congress had decreed preference to federal agencies over private bidders.

On balance, the chemical process industries gain. Shutdown of the Navy's paintmaking plants—now under way—was a victory for private suppliers. And plans to sell the Louisville butadiene plant for chemical use can be revived next April—without Congressional approval. Under present law, supervision of the plant can be transferred from the Treasury Dept. to General Services Administration when Treasury's existing lease to Publicker Industries expires in April. GSA can set its own terms for sale—including conversion to other than butadiene manufacture—without Congress' o.k.

The GOP may effectively halt Democratic sniping at business, its "concentration" and its "administered" prices, if it can take control of the Senate from the Democrats. And the possibility of such a takeover is real enough to have the Democrats worried. Betting is that the GOP will win the Aug. 27 contest to fill the vacancy caused by Sen. McCarthy's death. This would restore the Senate division of 49 Democrats and 47 Republicans.

But Democrat Sen. Matthew Neely of West Virginia is critically ill. And that state has a Republican governor who would name a successor—undoubtedly a Republican one. That would throw the Senate into a 48-48 tie, to be broken in the GOP's favor by Vice-President Nixon.



Business Indicators

WEEKLY

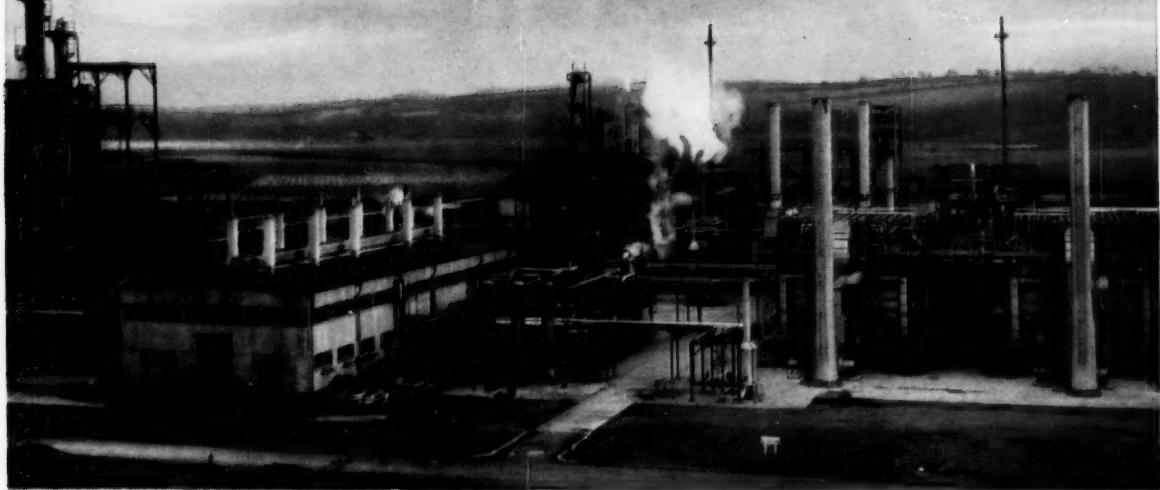
	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	182.0	181.0	174.5
Chemical Week wholesale price index (1947=100)	110.8	110.6	105.5
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	43.78	45.01	49.74

MONTHLY

Wholesale Prices (Index 1947-1949=100)

	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	125.6	125.2	121.4
Chemicals and allied products	109.4	109.3	107.3
Industrial Chemicals	123.5	124.0	122.1

ANOTHER EXPRESSION OF
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Stone & Webster Engineering Corporation and its affiliate, E. B. Badger & Sons Limited, designed and constructed these new facilities which doubled the Ethylene and Ethanol production capacity of British Hydrocarbon Chemicals Limited.

Having been responsible for the highly satisfactory original Ethylene and Ethanol facilities, the same team has completed or is currently executing other projects at this site including plants to produce Isopropyl Alcohol, Tetramer, Detergent Alkylate and Polyethylene.

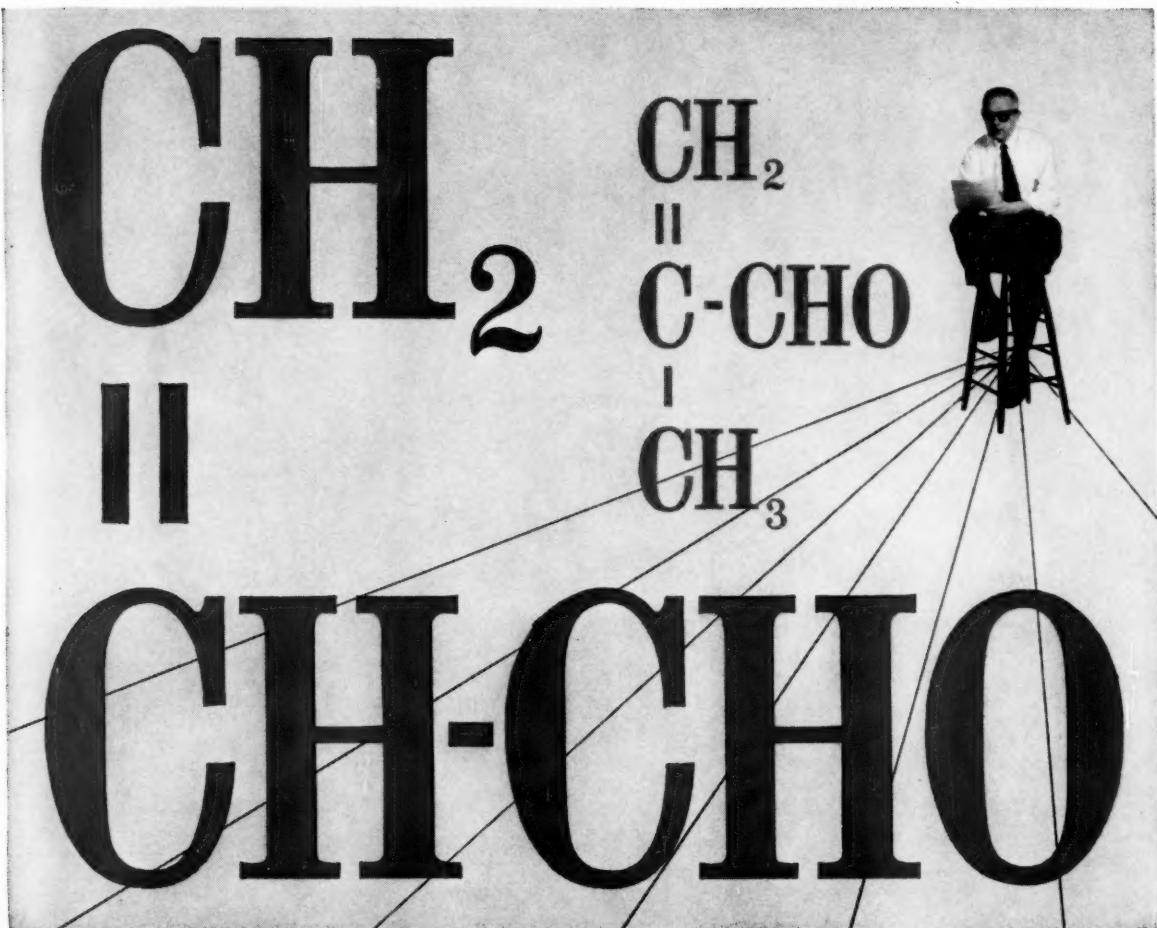
The skills and experience which have won such lasting client confidence are at your disposal. Write or call the Stone & Webster Engineering Corporation office nearest you.



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New directions for profits...

Acrolein reacts at both the double bond and carbonyl group to produce derivatives that have uses extending from textile resins to food supplements to mold inhibitors. The following references* indicate a few money-making opportunities with acrolein.

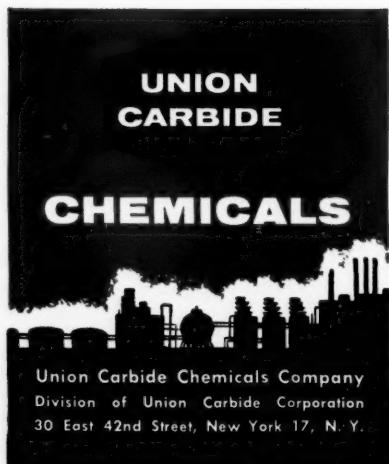
- | | |
|--|---|
| U. S. Patents 2,738,292—2,696,477..... | Acrolein resins for textiles |
| U. S. Patents 2,504,425—2,676,190—2,584,496..... | Methionine for food supplements |
| U. S. Patent 2,665,217..... | Dichloropropionaldehyde for controlling molds |

Acrolein and the following acrolein derivatives are available now in commercial quantities:

- Acrolein Dimer
(2-Formyl-3,4-Dihydro-2H-Pyran)
- Allylidene Diacetate
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- Glutaraldehyde
- 1,2,6-Hexanetriol
- 2-Hydroxyadipaldehyde
- 1,5-Pentanediol

Methacrolein, available now in drum quantities, undergoes many of the reactions of acrolein to produce methyl-substituted derivatives.

For more information on what both acrolein and methacrolein can do for you, send for our new booklet—"Acrolein and Derivatives" (F-40,118). Write Dept. N., Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, New York. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.



Union Carbide Chemicals Company
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N.Y.
TELEGRAMS: UNIONCARBIDE, NEW YORK

*Nothing herein shall constitute a recommendation to practice an invention covered by any patent without permission of the patent owner.

ADMINISTRATION

OUTSTANDING LONG-TERM LOANS

(Long-term debt due in more than one year; all dollar figures in millions; source: SEC reports.)

79 CHEMICAL COMPANIES

Company size, by total assets	Number of companies in sample	Combined total assets*	Aggregate long-term debt†		Percent change
			1955	1956	
\$ 1 to 9.9	12	\$ 67.0	\$ 4,439	\$ 4,127	- 7.0%
10 to 49.9	21	512.4	42,423	43,910	+ 3.5%
50 to 99.9	17	1,238.6	122,588	143,148	+17.5%
100 to 499.9	19	3,642.8	261,939	282,037	+ 7.7%
500 or more	10	8,753.8	864,130	767,400	-11.2%
TOTALS	79	14,214.6	1,295,519	1,240,622	- 4.2%

ALL MANUFACTURING COMPANIES

Company size, by total assets	Combined total assets*	Aggregate long-term debt		Percent change
		March 31, '56	March 31, '57	
Less than \$1	\$ 17,011	\$ 1,318	\$ 1,635	+24.0%
1 to 9.99	28,729	1,812	1,960	+ 8.2%
10 to 49.99	28,402	2,412	2,579	+ 6.9%
50 to 99.99	14,594	1,449	1,967	+35.8%
100 to 999.99	69,753	9,628	11,121	+15.5%
More than 1,000	52,366	4,658	5,642	+21.1%
TOTALS	210,856	21,276	24,906	+17.0%

*Total assets as of Dec. 31, '56.

†Aggregate long-term debt at close of fiscal years ending in 1955 and '56, respectively (in top section of table only).

Corporate Loans: Up Now, Drop Ahead?

A sharp drop-off in long-term borrowing from banks and insurance companies by chemical process companies appears to be in the making this week, following the recent rise in interest rates on industrial loans.

Most large commercial banks, following the lead of Bankers Trust Co. (New York), have boosted to 4½% their "prime rate"—the rate charged on loans to their largest and most reliable borrowers. The previous prime rate of 4% was in effect nearly 12 months.

For most chemical concerns, retained earnings—including depreciation set-asides—have been by far the largest source of capital over the past few years (*CW, March 30, p. 16*). Nevertheless, chemical process companies—along with most other manufacturing firms—have been doing more and more borrowing in recent years and months.

In the first quarter of this year, makers of chemicals and allied products increased their long-term indebted-

ness to banks by more than 20% (though for producers of industrial chemicals, the change was in the opposite direction—a 4% decrease). Another measure of this trend—changes in industrial loans by leading member-banks of the Federal Reserve System—shows that the total amount outstanding in loans to petroleum, coal, chemical and rubber companies has been rising irregularly: in 1953, up \$93 million; '54, up \$78 million; '55, up \$521 million; and in '56, up \$852 million.

During the first half of this year, this debt total increased \$18 million in January, then dropped \$45 million in February. There was a rise of \$80 million in March, \$29 million in April, and \$7 million in May. Then the total jumped \$201 million in June, making a \$290-million net gain for the six-month period.

Securities in Favor: Now a change seems to be setting in, starting even before the prime-rate increase was announced. New issues of debentures and other securi-



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ADMINISTRATION

LONG-TERM LOANS OF SIX PROCESS INDUSTRY GROUPS

Industrial category	Total assets Dec. 31, '56	Aggregate long-term debt March 31, '56	Aggregate long-term debt March 31, '57	Percent change
Chemicals and allied products	\$18,973	\$2,413	\$2,532	+ 4.9%
Rubber products	3,952	721	702	- 2.6%
Paper and allied products	8,492	1,126	1,340	+19.0%
Products of petroleum and coal	30,701	3,455	4,340	+25.6%
Primary nonferrous metals	8,035	939	1,217	+29.6%
Stone, clay and glass products	6,655	508	667	+31.3%
TOTALS	76,808	9,162	10,798	+17.8%

ties are being favored over bank and insurance company loans. In fact, a major purpose of some of the new issues is to pay off existing debt. Example: Polymer Corp.'s recent offering of new common stock—70,000 shares at \$19.50—to help retire a bank loan.

A few process companies have been borrowing this summer. Phillips Petroleum got in under the wire by obtaining a two-year, \$20-million bank loan just one week before the prime rate was boosted. Earlier, Southland Paper Mills sold \$7 million worth of 4 3/4% notes and planned for the sale of an additional \$5 million worth next year; and Sonoco Products Co. borrowed \$1 million on 3.85% notes, increasing its total debt on such notes to \$5 million, with an additional \$1.5 million to be borrowed by Dec. 31.

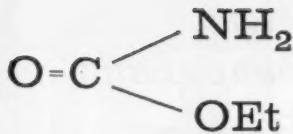
Equity appears to be the current trend in external financing for process companies. Among the concerns that have offered new common stock issues this summer, or are planning such issues for the future: Detrex Chemical Industries, Lafarge Cement Co., Macco Chemical Co., Molybdenum Corp. of America, Oxford Paper Co. and Polymer Corp. Turning toward preferred stock were Flintkote Co., Inland Cement Co., and Kaiser Aluminum & Chemical Corp. General Tire & Rubber Co. and Union Chemical & Materials Corp. are tentatively planning to offer debentures.

Up Mostly in the Middle: Among chemical companies and in all manufacturing industries generally, the biggest increase in long-term borrowing over the past year or so has been in the category of medium-size concerns with total assets in the \$50-100 million range (table, p. 29). The 79 chemical companies for which individual data were readily available accounted for 75% of the total assets of the companies included in the Securities & Exchange Commission's "chemicals and allied products" category. However, the data on aggregate long-term debt are not comparable, since the debt figures for the 79 chemical companies (itemized in the top part of the table on p. 29) do not include bonds, debentures, preferred stock.

Including all forms of long-term borrowing, the process industries—broadly defined—increased their indebtedness by more than one-sixth over 12 months (table, above).

Aside from the jump in interest rates and the desirability of keeping debt-to-assets ratios at reasonably low levels, one other factor that may play a part in stemming the rise in borrowing by industrial companies is current uncertainty about whether the economic boom is "topping out." If the chemical process companies elect to carry out their extensive expansion programs during the fourth quarter of this year, some of them will need outside financing; but present indications are that direct bank loans will be shunned.

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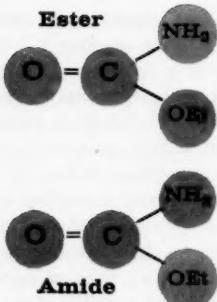
Classically known for many years but now available in commercial volume in both U.S.P. fused and crystalline grades, Urethane has many unique properties which offer interesting opportunities for investigation. Urethane finds wide application as an intermediate for the synthesis of pharmaceuticals and fine organics.

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FMC Organic Chemicals Division

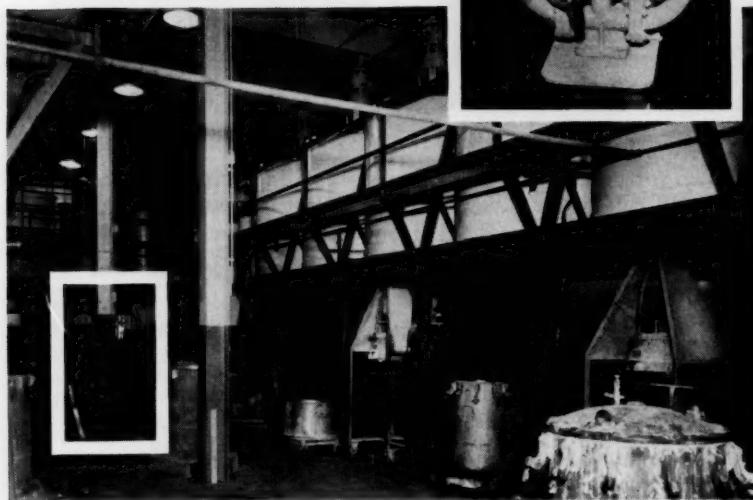
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ADMINISTRATION



ICWU's Mitchell: For stronger bargaining, a bigger strike fund.

LABOR

For More Vigorous Bargaining: President Walter Mitchell and other officers of International Chemical Workers Union (AFL-CIO) are plugging for a 50¢ increase in monthly per-capita tax (raised last year to \$1.25). Reason: to bolster the union's strike fund and permit local unions to "negotiate more vigorously." The union's executive board will submit this proposal to the convention scheduled to be held Oct. 14-18 in Detroit. Mitchell says ICWU members' present wage rates average at least 2¢ an hour lower than those prevailing elsewhere in the chemical industry; and that "it should be clear that our union cannot afford not to have a greater defense fund." The board is drawing up a plan for increased financial aid on an individual basis, with payments to be made to strikers according to individual need.

Stepped-up Hiring: Makers of chemicals and allied products increased their hiring activities more sharply than most other manufacturing industries in June, according to the Bureau of Labor Statistics. Hiring normally picks up in that month; but in chemicals, there was a nearly 127% rise in the accession rate from May to June, while the average for all manufacturing was a 26.7% gain. In chemicals and allied products, the accession rate jumped from 1.5 new hires per 100 employees in May to

3.4 in June; and the separation rate dipped from 1.7 to 1.4. Corresponding figures for last year were a May-to-June rise from 1.9 to 3.2 in accessions and an increase from 1.6 to 1.8 in separations.

Engineers to Convene: Next move toward establishment of the Engineers & Scientists Guild (*CW*, July 20, p. 52) is scheduled for early October in Fort Worth, Tex., where members of the ESG steering committee will meet to revise the proposed constitution and arrange for a founding convention to be held later. Steering committee chairman Charles Hall is trying to get groups of engineering employees—whether organized or unorganized—to send representatives to the Fort Worth meeting. Tentative program for ESG includes membership growth, "mature collective bargaining," serving as spokesman for engineering employees before governmental agencies and the general public, mutual assistance on the part of ESG units, and education and training for members.

IDEAS

Top-Level Decision: A 25-year-old method of assembling information that will reliably report a firm's financial health as a basis for top-level control decisions is the subject of a new book, "Higher Management Control," by T. G. Rose and Donald Farr (McGraw-Hill, \$6.50). The method's two steps: (1) determining what facts are of basic importance in guiding a business and (2) establishing a means of gathering and analyzing the facts. The book provides a complete set of specimen forms used with the method.

Industry-College Relations: National Starch Products has just completed a conference discussion and open house at its Plainfield, N. J., research facilities. Object: to better acquaint college placement directors with chemical industry needs and opportunities. Six colleges were represented.

Repeat Performance: Columbia University's course on commercial chemical development will be repeated this year, with a series of lectures by Carlton A. Sears, director of product application for American Cyanamid's Farm and Home Division.

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ADMINISTRATION

LEGAL

New Gas Explosion Suit: A 1955 compressed gas explosion is still having legal reverberations.

A \$115,000 damage suit has been filed in Knox County, Ohio, common pleas court by Cooper-Bessemer Corp. (Mt. Vernon, O.) against National Cylinder Gas Co. (Chicago) and Mansfield Oxygen Acetylene Supply Co. (Mansfield, O.).

The suit seeks \$55,000, charging the firms with negligence in shipping oxygen instead of nitrogen to Cooper-Bessemer. The alleged switch resulted in an explosion at the firm's plant Sept. 6, '55, that took the lives of three test engineers.

Cooper-Bessemer claims that the oxygen was shipped in unlabeled cylinders, that employees at Mansfield Oxygen said they contained nitrogen.

Another \$60,000 damages is asked to cover increased premiums Cooper-Bessemer says it has paid to the Ohio Industrial Commission—administering agency for the state's workmen's insurance plan—as a result of the deaths.

Following the explosion, Cooper-Bessemer's Ralph Boyer—vice-president and chief engineer—launched a bitter attack on compressed gas marketing practices, calling on the Compressed Gas Assn. to support stricter controls, including a uniform color code (*CW*, March 10, '56, p. 54).

Earlier this year, common pleas court at Mt. Vernon awarded \$125,000 to Mrs. Marvin Frady, widow of an engineer killed in the blast (*CW*, April 6, p. 61).

Restraint of Trade Charge: Hughes Tool Co. (Houston, Tex.) and a West German concern have been charged by the federal government with unlawful combination and conspiracy and restraint of interstate and foreign trade and commerce in oil and gas drilling equipment.

The antitrust action—filed in federal district court (New York)—charges Hughes and Alfred Wirth & Co. (Rhineland, Germany) with entering into unlawful agreements and suppressing competition.

The action seeks to enjoin Hughes from dealing in oil and gas drilling equipment, from carrying out their contracts, and from allocating territories for sale of equipment.

KEY CHANGES

A. B. Chadwick, to director of manufacturing, Velsicol Chemical Corp. (Chicago).

C. Chester Bassett, Jr., to vice-president, sales; and **Frits Prakke**, to vice-president, manufacturing, American Enka Corp.

George L. Innes, to manager, chemical sales and development, Climax Molybdenum Co.

Harold G. Shelton, to director of marketing, Dyestuff & Chemical Division, General Aniline & Film Corp.

Oscar T. Marzke, to vice-president, fundamental research, U.S. Steel Corp.

Richard Q. Livingston, to vice-president and director of marketing, Dana Perfumes Corp. (Chicago).

R. L. Hockley, to director, Amoco Chemicals Corp. (Chicago).

Martin A. Seidell, to medical director, J. B. Roerig and Co., division of Chas. Pfizer & Co. (New York).

W. B. Copeland, to division vice-president, Plant Food Division, Olin Mathieson Chemical Corp.

Edward A. Gumpert, to general product manager, Toilet Articles Division, Colgate-Palmolive Co.

Frederick A. Tilston, to president; and **Henry H. Tuckley**, to vice-president in charge of manufacturing, and director; Sterling Drug Mfg., Ltd.

George E. Drake, to vice-president in charge of sales; and **Stanley M. Norwood**, to assistant to the president; Electro Metallurgical Co., division of Union Carbide Corp.

Thomas M. O'Neil, Jr., to general manager of sales, Petroleum Chemi-

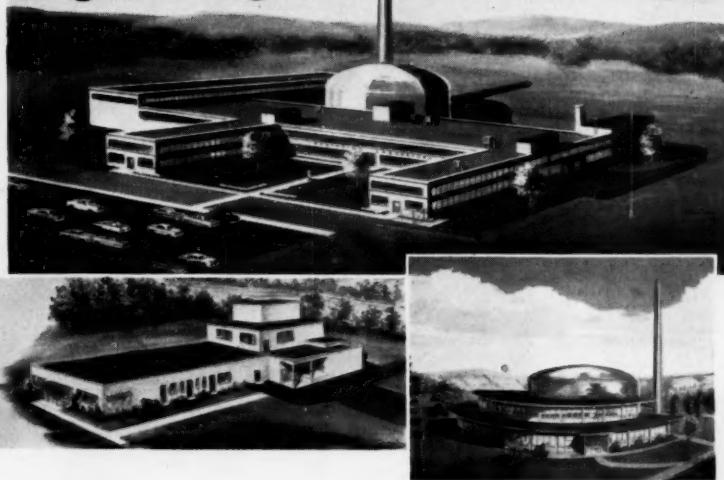
Jack M. Forehand, to controller, Heyden Newport Corp.

DIED

Harry M. Griffiths, 76, director and vice-president, International Salt Co., at Scranton, Pa.

Charles C. Concannon, 68, retired chief of the Chemistry Division, Bureau of Foreign and Domestic Commerce, U.S. Dept. of Commerce.

Engineering for the Atomic Age



ADVANCED LABORATORIES DESIGN

THE engineering and design of laboratories of the advanced type has been a specialty of Vitro Engineering Company over the past few years. Several of its design projects include the increasingly necessary "hot labs", or nuclear radiation laboratories. Some are for other highly specialized purposes—such as nerve gas, high temperature or biological warfare.

Vitro's rôle in the hot lab field is exemplified in the design of new radiation laboratories for The Texas Company in Beacon, N. Y., the CP-5 reactor facility in Milan, Italy, and others for a major oil company, a large electronics firm, and a prominent university.

Other recent Vitro laboratory design contracts include:

- Nuclear Development Center for Lockheed Aircraft — Dawsonville, Ga.
- Elevated Temperature Facility for General Electric — Evendale, O.
- Navy Aero Ballistic Facility — Whiteoak, Md.
- High Temperature Facility for Wright Air Development Center — Dayton, O.
- Animal Disease Laboratory for the Dept. of Agriculture — Plum Island, N. Y.
- Biological Laboratory for the Army Chemical Corps — Fort Detrick, Md.

The selection of Vitro to handle these key projects reflects solid performance in modern advanced laboratory design.

The atomic age requires many types of nuclear engineering—reactor facilities, central power stations, disposal systems, plants for processing ore, separating isotopes, reprocessing fuel or producing heavy water. Vitro Engineering Company has played a significant part in these activities—in many cases designing the pioneer plant.

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oleum

alums

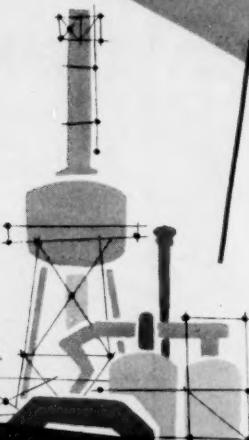
aluminum sulphate
ammonium-aluminum sulphate

alum liquor
potassium-aluminum-sulphate

animal by-products

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Kyowa's Kato: His plant at Hofu will soon be supplying about 30% of Japan's MSG industry with L-glutamic acid—made by fermentation.

Glutamic Fermentation Finds a Home

A fermentation process that has long been knocking on glutamic acid producers' doors finally succeeded in opening one—in Japan.

Kyowa Fermentation Industry Co. recently installed the process at its Hofu plant (pictured above) for the production of 2.4 million lbs./year of L-glutamic acid from sweet potatoes. And Kyowa's president, Benzaburo Kato, reports that existing facilities are now being converted, that capacity will be doubled by January.

Though the fermentation route hasn't been able to compete in the U.S. with abundant glutamine by-products of beet sugar processing, it appears well suited to the Japanese economy. By permitting the use of domestic sweet potatoes as a starting

material, it will reduce Japan's dependence on imported sources of glutten. Until now, the country has had to import about 200,000 tons/year of wheat and soybeans for its production of glutamic acid.

Chief outlet for glutamic is the production of monosodium glutamate, for which there is a large demand in the Orient. Since 1908, when a University of Japan professor first discovered MSG's flavor-enhancing properties, the Japanese have been among its top producers and consumers.* Annual production of MSG in Japan is in the range of 20 million lbs./year—about half of which is exported to Hong

Kong and Europe. (Total U.S. production was about 18 million lbs. last year.)

Sweet Potato Process: The Kyowa process, as described in Australian patent applications 23,556/56 and 23,557/56, starts with a culture broth of fermentable carbon sources (sweet potato carbohydrates), nitrogen sources and inorganic materials. The micro-organism used is a biotin-requiring strain of *Micrococcus*, which has the ability to produce α -ketoglutaric acid from saccharine materials, coupled with a strong activity for reductive amination of the acid into α -aminoglutaric (glutamic) acid.

During operation, the mixture is maintained at a pH of 6-9 under aerobic conditions. Biotin is added to

*One reason for its popularity: though of vegetable origin, it adds a meat flavor to foods, can be used in the diets of meat-abstaining Buddhists.

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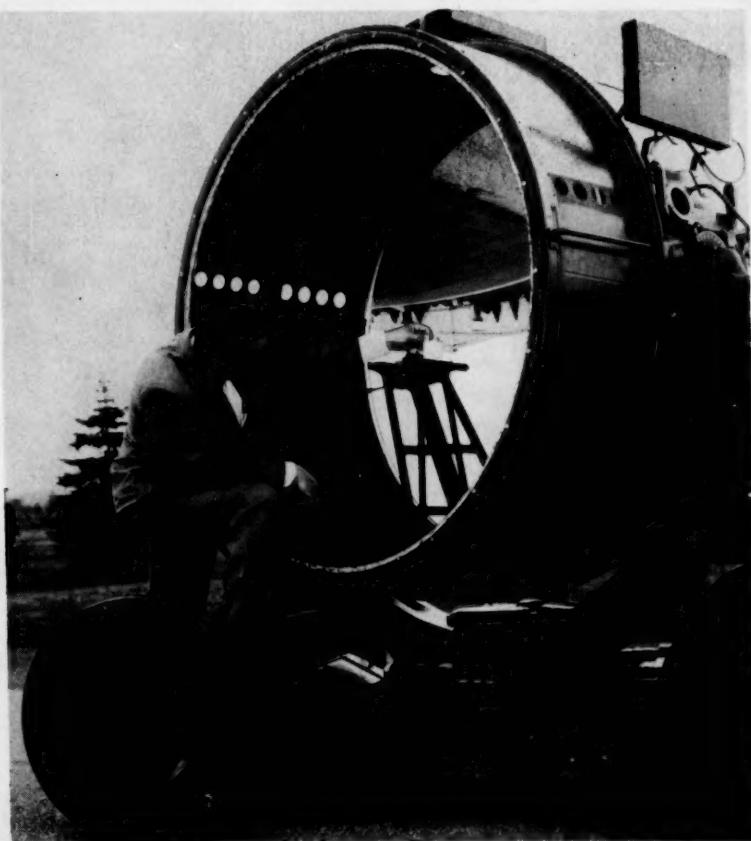
maintain optimum balance between propagation of the microorganism and the fermentation reaction. Yield is reported to be high, with no major by-products other than glutamic salts.

By-product Process: Chief source of glutamic acid in this country is the abundant waste from sugar refineries. Production of beet sugar by the Steffens process converts the glutamine contained in the beets into pyrrolidone carboxylic acid, which leaves the proc-

ess as part of the waste filtrate. MSG producers, e.g., International Minerals & Chemical Corp. (San Jose, Calif.) and Great Western Sugar Co. (Johnstown, Colo.), recover glutamic by hydrolyzing the waste, convert the resulting acid into the salt.

U.S. producers aren't overlooking any bets, have thoroughly investigated the feasibility of making glutamic by fermentation.

Evidence of their continuing interest



Focusing on High Temperatures

To aid development and study of new high-temperature materials, engineers at B. F. Goodrich's Brecksville, O., research center converted an Army surplus searchlight into a solar furnace.* The sample being placed at the focal point by Roger Strassburg (above) will be heated to 6300 F by concentrated solar energy to determine such characteristics as heat transmis-

*A slight switch on Arthur D. Little's gambit of using the high-intensity arc to substitute for sunlight in such a system. (CW, Feb. 9, p. 88).

sion, specific heat and melting point. An electronic guidance system housed in the boxes atop the furnace keep it trained on the sun; temperature is controlled by off-focus operation and by positioning of a shielding cylinder. An important advantage of solar heating, says BFG, is the lack of contaminants, which are introduced by furnace elements or the sample containers required for electric-arc or induction heating.

in this field is shown by recent fermentation process patents assigned to Pfizer (British 776,722) and Rohm & Haas (U.S. 2,798,839). Pfizer's process starts with α -ketoglutaric acid, utilizes urea as a source of nitrogen. Rohm & Haas' route, on the other hand, begins with citric acid and ammonia, involves the use of enzymes produced by bacteria such as *Pseudomonas fluorescens*.

Dual Goal: In addition to supplying some 30% of Japan's L-glutamic acid requirement, Kyowa hopes to peddle its know-how to interested firms in other countries. It reports that, to date, it has had inquiries from four companies in the U.S. and two in Europe. However, the company isn't planning to enter its fermentation glutamic in foreign market competition, will sell its entire output to Japan's leading MSG producer, Ajinomoto Co.

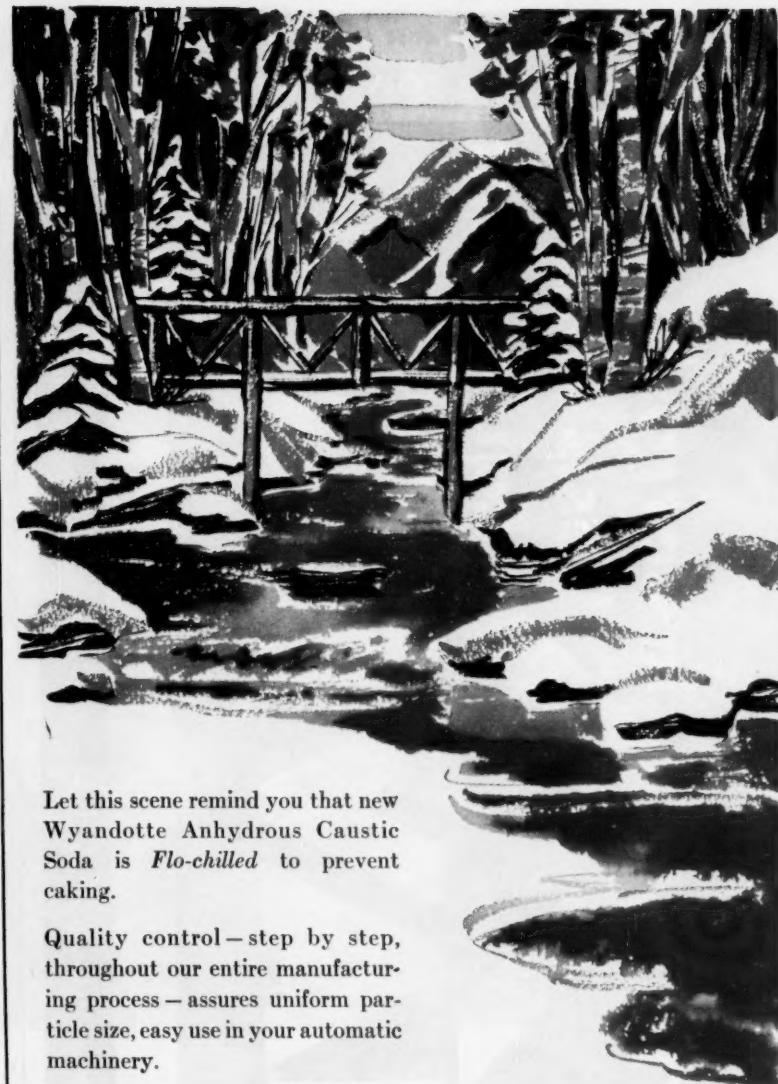
Though U.S. producers' interest in the fermentation route to glutamic acid is mostly academic at present, chances are they'll keep close track of its commercial success—and its impact on Japan's export business.

Chromyl Chloride Key

In the two and a half years since Allied's Mutual Chemical Co. division (Baltimore) introduced chromyl chloride as a new oxidant for organics (*CW*, Feb. 19, '55, p. 64), the product has grown rapidly from a pound-lot developmental material to a ton-lot chemical commodity. But heretofore the firm has not divulged its production approach. Now revealed as the key: a patented process (U. S. 2,793,937) in which the product lifts itself by its bootstraps by doubling as reaction medium for the tricky chlorination of chromic anhydride (CrO_3).

Coupled with high yields and high purity of chromyl chloride produced by the new process, volume-production economies have enabled Mutual to reduce the price of the material to 70¢/lb., approximately one-third of that at which it was first offered. This substantial reduction will undoubtedly increase chromyl chloride's chances of finding wider application in specialized organic processes.

Novel Properties: One of chromyl chloride's unusual properties is its miscibility with organics. Unique among chromium-containing oxidizers in this respect, the product has com-



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ENGINEERING

mercial potential as an intermediate. Mutual reports, in the preparation of such organics as aryl chromiums, organic chromates.

Its principal use, to date, has been in the manufacture of trivalent chromium coordination compounds. Many of these products have unique surface-modifying properties, are used to impart water- and oil-repellency to textiles, paper, leather and plastics.

Another important characteristic of chromyl chloride—and one that scored a big assist in the tricky processing of the material—is its ability to dissolve large quantities of chromic anhydride. Prior to the development of this present process, it was difficult to obtain high-purity chromyl chloride in good yields. By utilizing the product itself as reaction medium for the chlorination of chromic anhydride, MCC has effectively eliminated undesirable side reactions, achieves yields of 98% or better.

Two-Phase System: The chlorination of CrO₃ begins with the dissolution of the anhydride in a quantity of chromyl chloride reserved from a previous batch. An excess of the anhydride is commonly used to produce a supersaturated slurry, the concentration of which is limited only by the ability to agitate the suspension.

Upon addition of hydrogen chloride, the chromic anhydride reacts to yield chromyl chloride and water. The latter separates into an aqueous phase where it is absorbed by a dehydrating agent (e.g., chlorosulfonic acid, oleum). By decreasing the amount of reactants dissolved in the aqueous layer, the dehydrating agent boosts both the yield and the purity of product chromyl chloride.

The economies afforded by these new processing techniques—together with the product's novel qualifications—should go a long way to swell the steadily increasing applications of chromyl chloride in the production of specialized organic chemicals.

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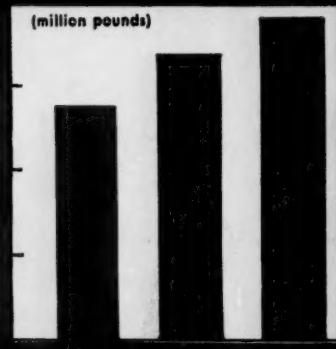
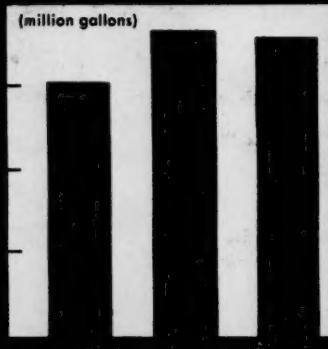
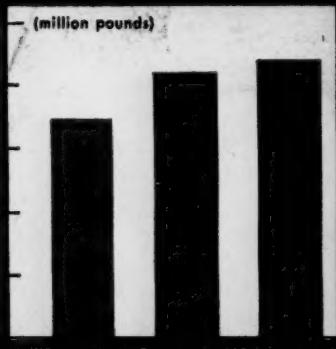
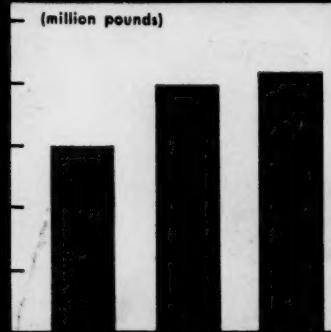
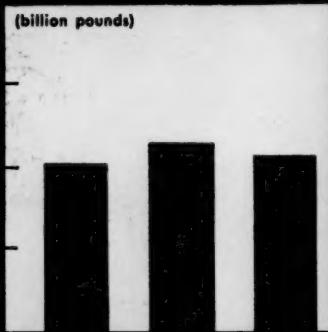


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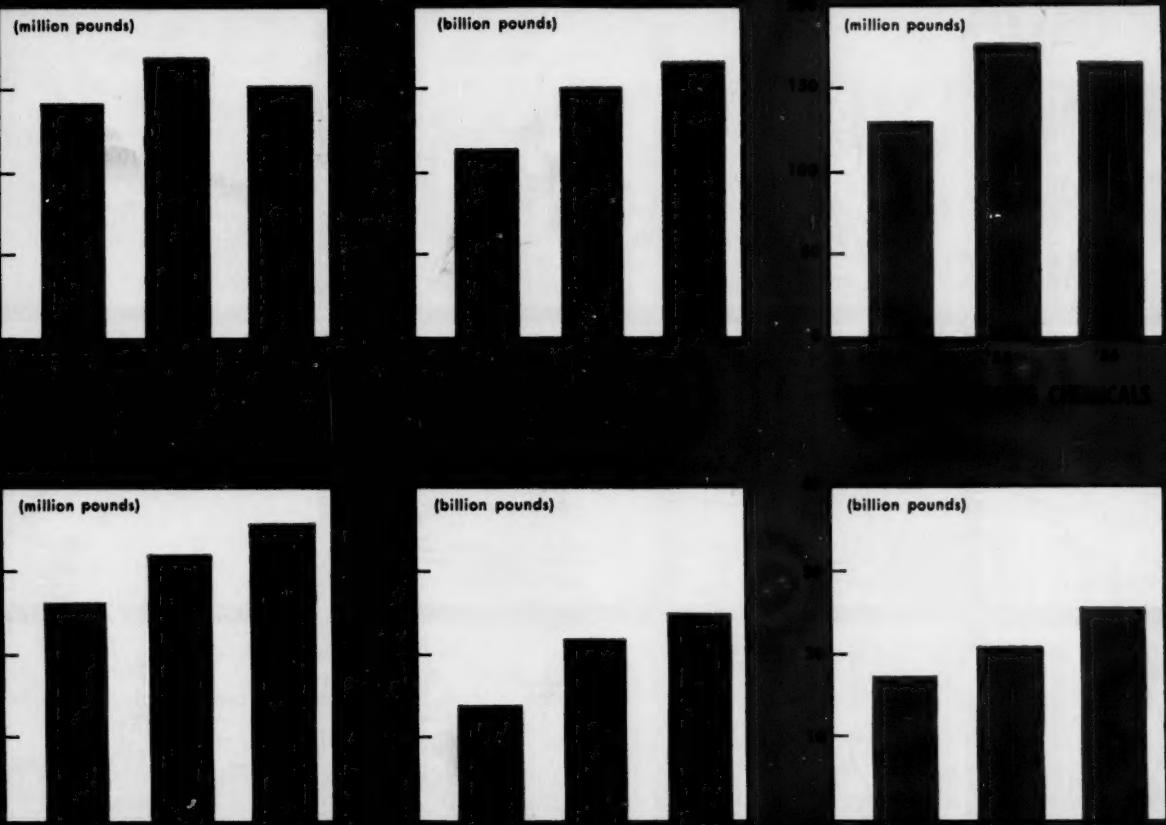
Synthetic Organics

The U.S. organic chemicals industry didn't fare as well in 1956 as it did in '55, according to preliminary production and sales figures issued during the past few weeks by the U.S. Tariff Commission.

Where 1955 could be described as a good year for every segment of the industry—as far as production was concerned—the same was not true for '56. Production declines were more numerous in '56; and there were no spectacular output jumps like those scored in '55 (*CW*, Aug. 4, '56, p. 112).

Unlike the pattern then, '56 sales did not follow the trend set by production. Total sales of intermediates, plasticizers and pesticides, for example, declined, although output of each was higher.

Nor is it possible to draw broad parallels between total sales and dollar values for last year's sales. In fact, it's in

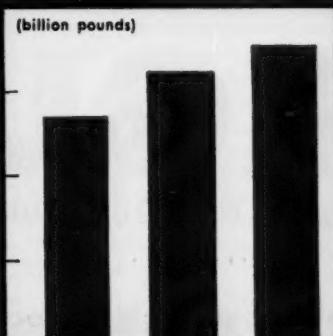


Plastics Ride a Rougher Road

this relationship—where closest agreement might be expected—that the most striking disparities are to be found, in looking at each segment of the organic chemicals industry, in turn.

Plastics and Resins: Total '56 domestic output of all synthetic plastics and resins (excluding cellulosics) was just short of 4 billion lbs., or about 6% more than the 3.7 billion lbs. reported for '55, says the Tariff Commission. Total sales climbed to a near 3.5 billion lbs. (worth \$1.14 million) from 3.2 billion lbs. sold in '55. Production of all cellulosic plastics last year amounted to 147 million lbs.

On individual plastics, vinyl and vinyl copolymer resins continued to hold top-volume position, with an output of 760 million lbs.—8% more than the 703 million lbs. produced in '55. Total vinyl resin sales of 722 million lbs. were valued at \$248 million.

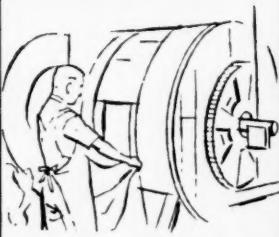


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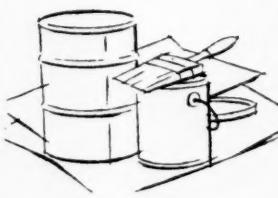
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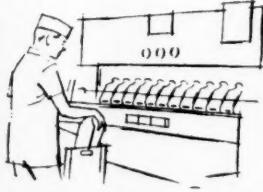
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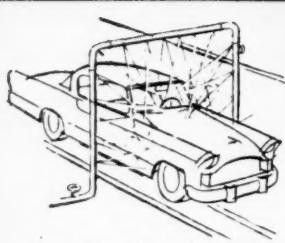
Dyeing and Finishing



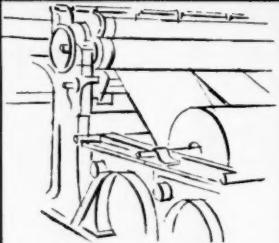
Paint



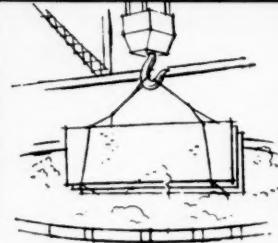
Bottle Washing



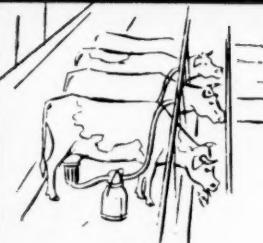
Car Washing



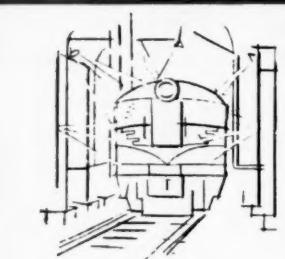
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Styrene resins ranked second, with 679 million lbs. produced and 603 million lbs. sold—valued at \$191 million. Polyethylene resins took third place; total production was 566 million lbs. Output of phenolic and other tar acid resins amounted to 563 million lbs. in '56—about the same as in '55.

Production of urea and melamine resins in '56 totaled 342 million lbs., of which 311 million lbs. were sold for \$92 million. Output of alkyd resins (used principally in protective coatings) slumped to 474 million lbs. in '56—about 12% below the '55 level.

Surface-Active Agents: Total output of surface-active agents* came to 1.07 billion lbs. in '56—4.1% more than in '55. Sales in '56 amounted to 988 million lbs., valued at \$205 million, compared with 962 million lbs. (worth \$229 million) in '55.

Production of cyclic surface-active agents last year climbed 7%, to more than 641 million lbs. Although sales also increased, to 632 million lbs. from 601 million in '55, the dollar values declined from \$136 million in '55 to \$108 million in '56.

Just the opposite was true of acyclic surface-active agents. Production eased off to 388 million lbs., about a million less than in '55, while sales dropped to 356 million lbs. from 361 million in '55. Nonetheless, '56 sales were valued at \$97 million, \$4 million more than in '55.

Pesticides: Output of all pesticides and other organic agricultural chemicals jumped a healthy 13% last year, checked out at 570 million lbs. Although sales volume dropped to 395 million lbs. (from 415 million in '55), dollar values increased to \$173 million, \$20 million above the preceding year.

Production of cyclic materials increased 10%, from 429 million lbs. in '55 to 474 million in '56. Sales, however, slipped to 339 million lbs., 15 million lbs. less than in '55. Value, however, was \$135 million, \$9 million more than in '55. DDT insecticide, with an output of 138 million lbs., was top-volume item in this category.

The acyclic pesticides and other organic ag chemicals showed a similar pattern. Production climbed 19 million lbs. last year, to 96 million lbs.,

* The surface-active agents figures for '56 include all principal types except oil-soluble petroleum sulfonates. These data were previously included in the group but are now reported with miscellaneous cyclic chemicals.

while sales dropped to 57 million lbs. from the 61 million sold in '55. Dollar value of product increased to \$38 million from \$27 million in '55.

Plasticizers: After a dazzling 32% production jump in '55, it wouldn't have been surprising to see plasticizers among the groups whose production leveled off or declined in '56. But '56 plasticizer output actually increased 5.3%. Total production was 417 million lbs., compared with 396 million in '55. Volume of sales was down to 331 million lbs., 7 million less than in '55, although dollar value increased to \$106 million, \$2 million more than in '55.

Production of cyclic plasticizers—principally esters of phthalic anhydride and certain phosphoric acid esters—amounted to 315 million lbs., slightly more than the 296 million reported for '55. Sales dropped to 243 million lbs., from '55's 253 million. Again the dollar value was up, by \$1 million, to \$73 million.

Production of acyclic plasticizers (some phosphoric esters and esters of adipic, azelaic, oleic, stearic and other acids) hit 102 million lbs. in '56, about the same as in the previous year. Sales volumes and dollar values for '56: 88 million lbs., worth \$33 million; for '55, 85 million lbs., \$32 million.

Dyes: Total domestic output of dyes in '56 was 152 million lbs., 9.5% less than in '55. That year's production jumped 17% over '54's. Sales of dyes in '56 amounted to 155 million lbs., 1 million less than in '55, and were valued at \$185 million, \$1 million more than in '55.

Individually, many dyes showed significant gains or declines. Representative of dyes substantially on the upside: acid black 10B, 23%; indanthrene olive T, 19%; Sudan I, 18%. On the other hand, production of synthetic indigo in '56 was down 25%; direct black EW, 12%; chrome blue black R, 70%; indanthrene brown BR, 44%; anthraquinone vat green B and black B, 37%; algol yellow GC, 35%.

Four chemical classes of dyes accounted for 82% of the total produced last year: azo dyes, 34%; anthraquinone vat dyes, 19%; sulfur or sulfide dyes, 21%; indigoid and thioindigoid dyes, 8%. Output of each type (with one exception) was far down from its '55 production level. Anthra-

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quinone vat dyes skittered 27%; indigoid and thioindigoid, down 21%; azo 15%. Output of sulfur dyes, however, increased 26%.

With respect to application, two classes accounted for more than half the total output of all dyes in '56 (vat dyes, 32%, and direct dyes, 20%). Production of vat dyes and of direct dyes in '56 was down 13% and 8%, respectively, compared with '55 output.

Toners and Lakes: Over-all output of full-strength toners, extended toners and lakes amounted to 41 million lbs. in '56—a 7.9% decline from the 44.5 million lbs. made in '55. Sales of 33.1 million lbs., valued at \$57.8 million, represent declines of 12.9% in weight and 10.1% in value, compared with '55.

Output of full-strength toners was 28.5 million lbs.—down 8.7% from the '55 output. Sales also declined, to 22.4 million lbs. (worth \$45.7 million). Compared with '55, this is a 14.5% cutback in quantity, and a 12.8% drop in total value.

Combined production of extended toners and lake colors amounted to 12.5 million lbs. in '56, compared with 13.3 million lbs. in '55. Of the total '56 output, 7.3 million lbs. were extended toners, 5.2 million lbs. were lakes.

Tar and Tar Crudes: Total domestic output of all tars (coal tar, water-gas tar, and oil-gas tar) amounted to 891 million gal. in '56. That was about 3% less than the 914-million-gal. tally for '55.

In the basic aromatics* produced from tars, benzene and toluene, output for '56 was 337 and 174 million gal., respectively. (Comparable figures for '55: benzene, 307 million gal.; toluene, 186 million gal.) Xylene production for '56: 136 million gal.

Last year's production of crude naphthalene was 491 million lbs. (up 14 million lbs. from '55). Naphthalene sales in '56 came to 289 million lbs., worth \$19 million.

Production of creosote oil in '56 totaled 132 million gal., a 2-million-gal. hike over '55. The output of road tar in '56 was 92 million gal., about the same as in the preceding year.

Crudes: The total output of crude

*Industrial and specification benzenes include that produced from petroleum and imported crude materials. Toluene includes material produced from petroleum for use in aviation fuel. Xylene includes that produced for blending in motor fuel.

products from petroleum and natural gas was more than 17.6 billion lbs. in '56—about 9% more than the 16.2 billion lbs. produced in '55. Sales increased from about 10.4 billion lbs. in '55 to nearly 11 billion last year.

Production of all aromatic and naphthenic products totaled more than 3.4 billion lbs., 9% higher than in '55. Sales in '56 increased to 2.5 billion lbs., worth \$92 million, over the previous year's less-than-2.4 billion lbs., worth \$90 million.

The output of benzene (except motor-grade) from petroleum was 818 million lbs. in '56—an increase of 13%. Production of toluene came to 947 million lbs. (compared with 1 billion plus in '55). Xylene output increased to 895 million lbs. in '56, from 699 million in '55.

Production of aliphatic hydrocarbons climbed to more than 14.2 billion lbs. in '56 from about 13 billion in '55. Sales were higher, too—a near 8.5 billion lbs. (valued at \$278 million), compared with a little more than 8 billion lbs. (value, \$271 million) in '55.

Turnout of ethylene was more than 3.6 billion lbs. last year (vs. just over 3 billion in '55). Propane output was nearly 2.2 billion lbs., propylene was about 1.4 billion lbs.—both representing increases over '55 output. Butadiene production was about 1.5 billion lbs. in '56 vs. 1.4 billion in '55.

Cyclic Intermediates: Total output of cyclic intermediates in '56 was 6.6 billion lbs.—a 10% production boost over '55. This increase comes on top of a big 30% increase in '55 over '54. Incidentally, three-fifths of the '56 intermediate output went into captive uses. Sales of cyclic intermediates in '56 were well over 2.5 billion lbs. (worth \$444 million), down from the near 2.8 billion lbs. that sold for \$408 million in '55.

Production of two intermediates exceeded 1 billion lbs.—styrene, 1.17 billion lbs., up 16% from '55; ethylbenzene, 1.17 billion lbs., up 8%.

Percentage increases chalked up by other intermediates included: dodecylbenzene, 25%; cresylic acid, 23%; cresols, 15%; phenol, 6%; monochlorobenzene, 4%.

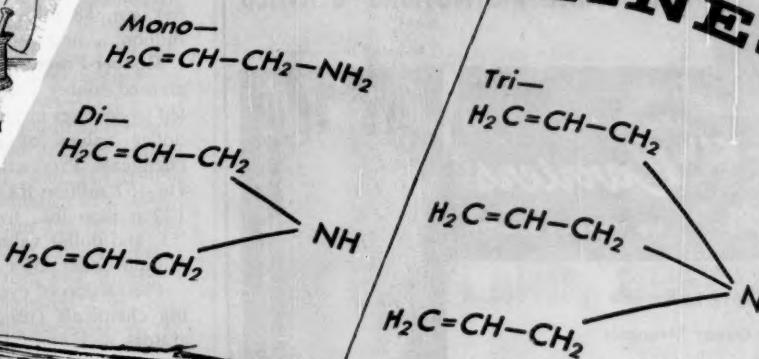
But the production of other intermediates slipped in '56—e.g., naphthalene, 14%; aniline and nitrobenzene,

*The increase in xylene production is attributed, in part, to the inclusion of motor-grade xylene that had not been reported previously.



A. W. HOFMANN

ALLYLAMINES



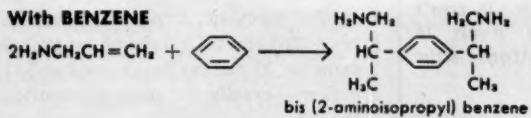
How many more uses can you find for Allylamines?

Commercial quantities now available from new Shell facilities

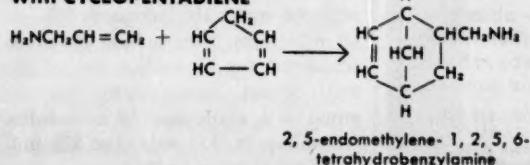
In mid-nineteenth century A. W. Hofmann, a German chemist, first synthesized the allylamines. Subsequent work by many chemists has now provided a basis for their first commercial production. Perhaps you are one of those who have worked with allylamines in the past. If so, when you refer to those old notebooks for thoughts you once had—remember—mono-, di-, and triallylamine are now available to meet your production needs.

The following allylamine reactions illustrate the many uses of these unique materials:

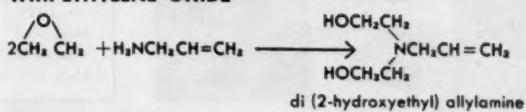
With BENZENE



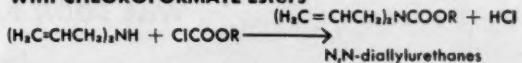
With CYCLOPENTADIENE



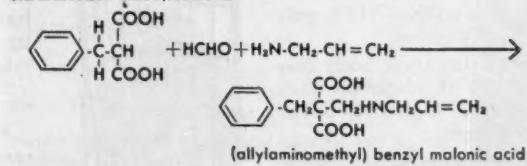
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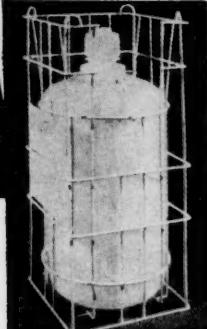
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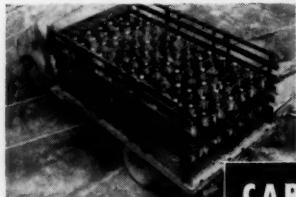
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Included for the first time in Tariff Commission reports were production figures for the following intermediates: cyclohexanone, 125 million lbs.; cyclohexanol, 88 million; bisphenol-A, 25 million; α -methylstyrene, 11 million.

Rubber-Processing Chemicals: Decreased rubber requirements last year led to declines in production, sales and dollar values of rubber processing chemicals. Production was down 6% (to 167 million lbs.); sales dropped to 132 million lbs., from 143 million in '55, and dollar values were shaved \$5 million under '55's \$86 million.

Production of cyclic rubber-processing chemicals (used chiefly as accelerators and antioxidants) totaled 141 million lbs. in '56, vs. 148 million in '55; sales in '56 were 111 million lbs. (valued at \$67 million), compared with 121 million lbs. (\$71 million) for '55.

Acyclic rubber-processing chemicals are used chiefly as accelerators and peptizers. About 26 million lbs. were made in '56, 29 million lbs. in '55. Sales and dollar values were cut back to 21 million lbs. (\$14 million)—from 22 million lbs. (\$15 million) in '55.

Flavor, Perfume Materials: Total output of flavor and perfume materials was 44 million lbs. in '56—5% more than the 42 million lbs. reported for '55. Sales amounted to slightly less than 39 million lbs., valued at \$53 million, compared with 36 million lbs. and \$53 million in '55.

Production of cyclic flavor and perfume materials last year increased 4%, to 25 million lbs. (Important products included in this group are methyl salicylate, terpineols, anethole, phenethyl alcohol.) Sales of the cyclics came to 20 million lbs., valued at \$31 million—exactly the same as reported for '55.

Production of acyclic flavor and perfume materials increased 6%—to 19 million lbs. Monosodium glutamate accounted for 18 million lbs. of the total output. Sales volume for the group as a whole was 18 million lbs. (16 million in '55), valued at \$22 million (the same as in '55).

Medicinals: Total output of medicinals (in bulk) last year was 89.3 million lbs.—13.5% more than the 78.7 million made in '55. Volume sales increased 6.7% from 68.5 million lbs. (worth \$465 million) in '55 to 73.1

MARKETS

million lbs. (\$503 million) in '56.

Antibiotics production, for human and veterinary purposes, jumped 25%, to 2 million lbs. Almost as big was the boost in sales volume—up 21.4% to a total of 1.7 million lbs. However, the dollar value (\$269 million in '56) increased a relatively small—though still significant—11.1%.

Penicillin salts gained in all respects: production increased to 478 trillion International units, from 344 trillion units in '55; sales climbed to 449 trillion units in '56, from 336 trillion the year before; the dollar value increased to \$62.5 million, from \$44 million.

Miscellaneous Organics: Total output of miscellaneous chemicals in '56 was 25.2 billion lbs., 21.3% more than in '55. Sales in '56 totaled 10.1 billion lbs., worth \$1.6 billion—a 5.2% increase in quantity, 14.3% increase in value, compared with '55.

The '56 outputs of the more important cyclics, in this group: lubricating oil additives (some formerly classified as surface-active agents), 348 million lbs.; tanning materials, 34.9 million; camphene, 22.9 million; hexamethylenetetramine, 29.3 million; naphthenic acid salts, 18.3 million.

Total output of miscellaneous acyclics: 24.6 billion lbs. in '56, compared with 20.3 billion lbs. in '55. Sales: 9.7 billion lbs., valued at \$1.4 billion, compared with 9.3 billion lbs., worth \$1.3 billion, in '55.

Chemicals whose production exceeded 1 billion lbs. in '56: synthetic methanol, 1.6 billion; 37% formaldehyde, 1.4 billion; isopropyl alcohol, 1.1 billion. Output of ethylene oxide and ethylene glycol was slightly more than a billion pounds each.

Elastomers: Output of synthetic elastomers (except vinyl types—now included with plastics and resins) was over 2.3 billion lbs., 11% over '55. Sales were nearly 2.2 billion lbs., valued at \$588 million.

Output of cyclic elastomers (mostly polybutadiene-styrene type) rose to 1.8 billion lbs., from 1.64 billion in '55. Production of acyclic elastomers (except vinyl types): 506 million lbs. It was 440 million in '55.

Although the Tariff Commission statistics on the various categories of synthetic organics are labeled "preliminary," much of the data is virtually complete, will show little change when the commission's final report is published late this year.

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RESEARCH



Bell Lab's Buehler: After 67 passes, a bid for silicon honors.

New Try at Getting the Most Out of Silicon

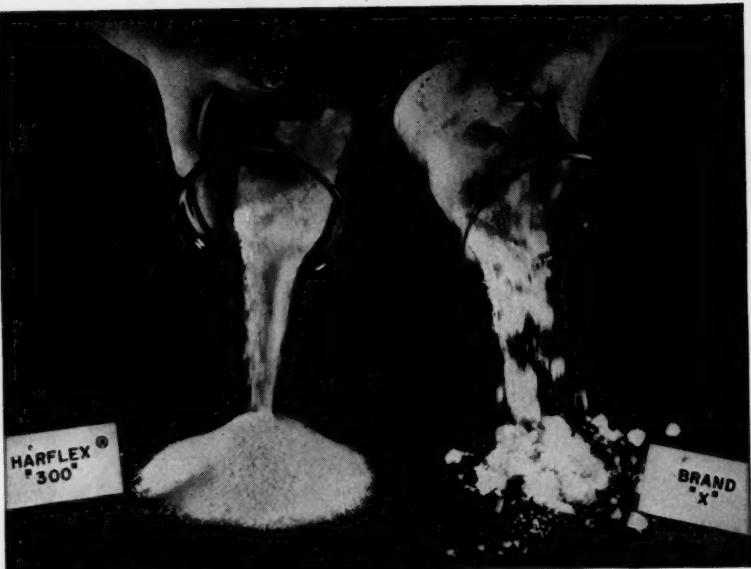
Superpure Silicon Timetable

- 1953 "Floating Zone" silicon purification technique unveiled by Signal Corps Engineering Laboratories (Fort Monmouth, N.J.).
- 1954 General Electric reveals its use of the method to make crystals of "near perfect" purity in transistor research (CW, Dec. 25, '54, p. 62).
- 1957 Westinghouse reports production of the "world's purest silicon." Bell Telephone Laboratories describes its modified "floating zone" apparatus featuring a moist hydrogen atmosphere to remove boron. New chemical method, developed by Sylvania Electric, is able to detect one part of boron in one billion parts of silicon.

Hampered by hard-to-remove trace contaminants, silicon still hasn't achieved its fullest potential in electronic applications. Although it is available (from Du Pont, Sylvania, Eagle Picher, etc.) to electronics firms in high purity (commercial grades range from 11 down to 3 parts of impurity in a billion parts of silicon) it must be refined further for certain uses. But this week, a new, purer-than-ever silicon developed by Westinghouse is being readied for the market.

Called "the world's purest silicon," it contains less than one part impurities in 6 billion of silicon, is said to make possible transistors and rectifiers having two to four times the voltage—and power—handling capacities of those now in use.

Just how Westinghouse makes its new silicon isn't



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M-32

RESEARCH

being divulged by the company. But it's no secret that the firm, like other major electronics companies (see p. 51), has been heavily researching zone refining—a technique pioneered at Bell Telephone Laboratories (New York)—and its successor, "floating zone" refining.

According to L. R. Hill, manager of the firm's semiconductor plant at Youngwood, Pa., Westinghouse will license other companies in this country to make the new silicon, which he expects will be available in sizable quantities. Since the product stems from work by Germany's Siemens & Halske and Siemens-Schuckert companies, as well as by Westinghouse, licenses will be granted under the technology and patent rights of all three companies.

The "floating zone" tack, pioneered by Paul Keck*, newly appointed manager of the solid-state physics branch of Sylvania's research laboratories (Bayside, N.Y.), side-steps the use of a crucible (and resulting contamination) in silicon purification. Like zone refining, it makes use of the principle that the impurities present are more soluble in molten than in crystalline silicon. In the process, a rod of silicon is mechanically rotated and moved on its axis inside a gas-tight silica enclosure. At one end of the rod, a molten zone, supported only by surface tension, is formed by inductive heating. This zone moves to the other end of the rod, sweeps impurities with it. Movement is in one direction only (the molten zone is continuously reformed at the same end of the rod) and is carried on mechanically until the desired purity is obtained.

Since Keck's discovery, "floating zone" refining (incidentally, a term coined by Keck) has come a long way. Bell Telephone Laboratories, for example, has worked out a device that moves the silicon rod vertically in a moist hydrogen atmosphere. Reported recently by Bell's Ernest Buehler (*The Review of Scientific Instruments*, Vol. 28, No. 6, June, '57, p. 453), the highly efficient device turns out p-type silicon (p means an excess of "holes"; n means an excess of electrons) having unusually high resistivity (a gauge of

*Although the technique was probably invented independently in several laboratories, Keck is frequently credited with its invention. While with the Signal Corps Engineering Laboratories, Fort Monmouth, N. J., Keck introduced the method publicly at a meeting of the Physical Society at Cambridge, Mass., on Jan. 22, 1953.

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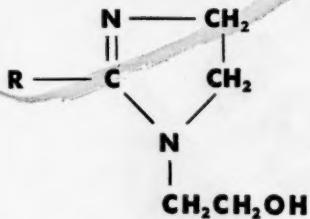
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Westinghouse's Hill: In ultrapure silicon, broadening markets.

purity) of 16,000 ohm-cm. After 67 passes, Bell's silicon (which the firm believes is the purest ever produced in quantity) has "an impurity content of less than one part per billion."

That may not seem particularly impressive in view of the purity obtainable in silicon's semiconductor competitor, germanium [one part per 10 billion (*CW*, March 13, '54, p. 82)], but silicon is notoriously difficult to purify.

That's the reason why most of the silicon production has gone into rectifiers rather than transistors. Most of the latter are made from germanium. (An estimated 12.5 million transistors were made last year. By 1965, forecasters believe, annual sales will soar to half a billion.) Rectifiers place less critical demands on silicon purity.

Better silicon will broaden the element's transistor applications, help electronics firms take better advantage of silicon's superior temperature resistance and electrical characteristics (*CW*, Jan. 30, '54, p. 43). The best of present silicon transistors are rated at 60 volts, 2 amperes. With the newest silicon, transistors rated at 300 volts and 20 amps. have been made.

Even in rectifiers, Westinghouse's entry boosts the voltage now obtainable—from 600 volts, tops, to 1,000 volts. And silicon rectifiers will need all the improvement possible, according to recent studies on their failure rates. In a paper prepared for a recent

American Institute of Electrical Engineers meeting,[†] N. F. Bechtold (Signal Corps Engineering Labs.) and C. L. Hanks (Battelle Memorial Institute) gave these conclusions after failure-rate studies. "The magic word 'semiconductor' has been placed upon the lips of almost every electronically minded individual in this country through untiring publicity efforts by manufacturers and their representatives. In accomplishing this purpose, the sales promoter has often impaired the future value of these new devices with predictions of unlimited life and hopeful claims for operating capabilities. These claims, although corroborated by theory, apparently have not yet been fulfilled in reasonable quantity with present production techniques for low-power silicon rectifiers. Until greater reproducibility can be attained, derating of both forward current and reverse voltage is necessary for a useful low failure rate."

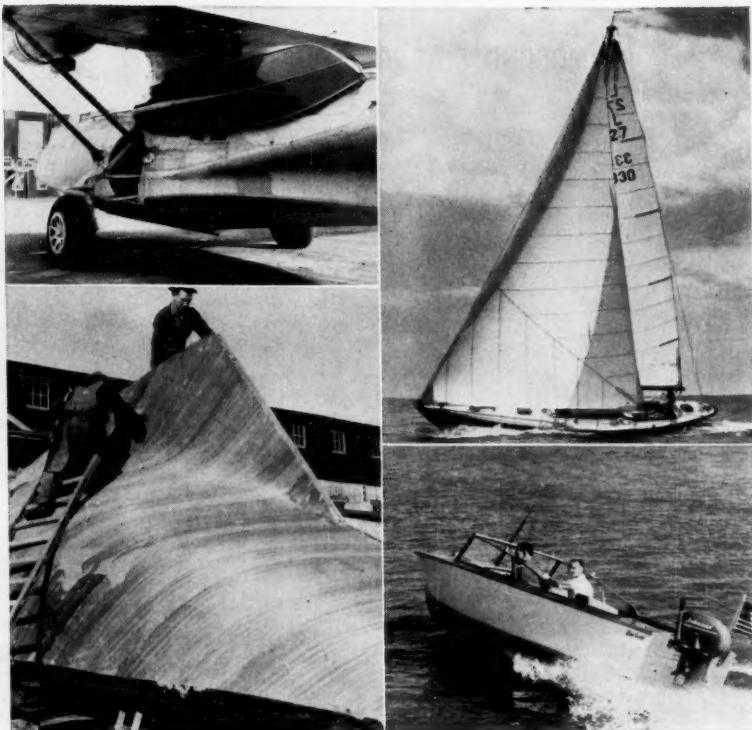
Purer silicon should make such improvement possible. And fringe research is helping, too. One such development is a new method of determining traces of boron in silicon, worked out by George Morrison and Richard Rupp of Sylvania's chemistry laboratory (Flushing, N.Y.). It features unprecedented sensitivity (down to one part of boron in a billion parts of silicon). Significance: it is an explicit chemical method that replaces previous (more or less conjectural) analysis, which depended on inference from electrical measurements of the silicon, and should lead to more precise control of silicon purity.

Another improvement, applicable to semiconductor components in general, is a new washing technique, to remove surface contamination, worked out at Bell Labs.

While germanium and silicon are still the best known semiconductors, they'll be getting more competition. So any improvements in either of these metals can't come too soon. Silicon, in particular, will run head on—in the years ahead—into such adversaries as indium phosphide, aluminum antimonide, and gallium arsenide.

But higher-purity raw silicon, coupled with the newest refining techniques, could stave off that threat for a long time to come.

[†]"Failure-Rate Studies on Silicon Rectifiers"; recommended by the AIEE Committee on Metallic Rectifiers for the AIEE summer general meeting, Montreal, Que., Can., June 24-28, '57.



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Among many industrially valuable properties of phenolic resins developed by Durez, resistance to water absorption is well and truly demonstrated in boat hulls.

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Caulking and puttying are eliminated. The molded hulls do not support

fungus growth. If heavy grounding or pounding on rocks abrades or punctures the shell, it is more easily repaired than a planked vessel.

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Technology Newsletter

CHEMICAL WEEK
August 24, 1957

New steps to developing a catalytic afterburner for automobiles
were reported by Ford Motor Co. researchers at a meeting of automotive engineers in Seattle last Friday. Pellets covered with vanadium pentoxide catalyst eliminated 80% of the troublemakers in the automobile's exhaust, operated successfully for 100 hours in a single-cylinder engine, they reported.

The company now feels that, economically, an exhaust device looks more attractive than ever. It won't commit itself, however, on when such an item could be designed.

The impact of a commercial device on the chemical industry
would be considerable. It has been estimated that the catalyst business in Los Angeles County alone would initially be \$25 million and at an annual rate of \$12.5 million after the first year (*CW, June 2, '56, p. 84*).

And Ford's work may indicate a switch in thinking on the part of the car makers. Previously, they had taken a dim view of the catalytic approach. But Ford is the only one in the automotive industry that's known to be working on the idea. In fact, very little has been published on catalytic afterburners, except about the work by Oxy-Catalyst (Wayne, Pa.). This firm is still actively developing such a device.

Ion exchange may find gainful use in the wine industry. Karl Wente (Wente Bros.) recently told the Wine Institute Technical Advisory Committee about work done for the firm at the University of California. He says that ion exchange prevents the precipitation of tartrate crystals after the wine has been bottled.

The present method of doing that is to chill the wine at —4 cc for prolonged periods. But, as Wente sees it this can damage the flavor and bouquet of a light wine; also, it entails a sizable capital investment and costly maintenance, and adds extra operations that tend to oxidize the wine.

Small amounts of cation-exchange resin (4 lbs./100 gal. of wine), he says, accomplish the same results without the disadvantages. In the proposed treatment, the resin is simply added to the wine, and the wine is drawn off immediately. The wine is not run through a column. The resin found best for the job is a phenolic-base sulfonic acid exchange resin developed by Chemical Process Co. (Redwood City, Calif.), Tradename Tartex, which costs about \$20/cu. ft. Chemical Process has offered to regenerate the resin on an exchange basis. Wente's figures indicate the cost of treatment should be less than 1¢/gal. of wine.

The concept is not entirely new. Other American wineries are experimenting with it, too. And in Europe, ion exchange has been em-

Technology

Newsletter

(Continued)

ployed in wine making for some time. But the alcohol laws there, of course, differ substantially from the U. S. laws.

Phosphoric acid is a fine soil stabilizer, Monsanto reports.

Recent studies in its laboratories, the firm says, show that 2% phosphoric acid added to a fat, plastic clay produces—when compacted—a mass that can stand up under prolonged exposure to water and wintering. Even better results have been obtained, it says, by addition of a second material —like its Amine ODT.

The clays it is working with are heavy ones. When dry, they have high bearing strengths, would be suitable for subgrades or base course construction. The trouble comes when they become wetted. The soil structure expands and the mass loses strength—and that's what Monsanto aims to overcome with phosphoric acid. The firm points out, however, that it will be some time before the full worth of the method is determined. The company is conducting development work with several state highway departments.

Thorium will get a tryout as a nuclear fuel in Britain. The Atomic Energy Authority there plans to study it in high-temperature, gas-cooled reactors. This was disclosed last week when General Electric revealed it had been awarded a government contract for design and construction of a zero energy assembly for an experimental reactor. The fuel will probably not be in the metallic form, however. It will probably be incorporated, along with uranium, into ceramics. The idea will be to add a charge of uranium-233 and thorium to breed uranium-233.

Also, the reactor will explore use of higher temperatures for nuclear power generation. It has been suggested that temperatures up to 1400 F will be attainable.

Can a blast furnace be used in zinc smelting instead of retorts?

First details of such a development were revealed last week by Imperial Smelting in England. The company now reveals it produced 70,000 tons of prime Western-grade zinc by that method over the past three years. Operations were carried out at the rate of 70 tons/day in two prototype plants.

The big advantage for the operation is a bigger throughput—10 times the amount that can be attained through use of retorts.

But developing the process took some engineering doing, since zinc emitting must be separated and condensed from its gaseous state. To make matters worse, the zinc must be scrubbed from a gas that's low in zinc and high in carbon dioxide. And those are conditions that are attractive for oxidizing the zinc right back to its oxide.



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Chemical

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SPECIALTIES



American-Marietta's Pflaumer: His company diversifies again.

Taking A-M Into Inkmaking

Diversified American-Marietta, producer of building and construction materials, coatings, paints, resins, etc., last week moved into still another field—inkmaking. Stockholders of inkmaking Sinclair & Valentine approved an agreement by which 1.5 shares of S&V common stock is exchanged for each of American-Marietta's 209,969 shares of common.

Sinclair & Valentine will provide American-Marietta with an established, basic position as supplier to the packaging, publishing and printing industry. Total sales for S&V are about \$25 million yearly, making it about the No. 3 firm in the \$250-million/year printing ink business (behind Interchemical and Sun). S&V has 37 plants in 22 states, eight plants in Canada and some additional foreign operations in Mexico, Cuba and Colombia.

American-Marietta doesn't break down its current \$203-million gross sales, but CW "guesstimates" it this way: \$100 million from building and construction material sales; \$40 mil-

lion from industrial paints and chemical coating; \$25 million from consumer paints and household products and \$35 million for resins, adhesives, metal powders, etc.

American-Marietta has shown a remarkable growth in sales under the leadership of Emil Pflaumer. Just five years ago (CW, July 7, '52, p. 55), the company's annual sales were only about \$66 million—less than a third of this year's total. At that time, protective coating and paints accounted for 78% of the company business, brick, 8%, and tile, 14%.

On Its Own: As it has with other acquisitions, A-M will keep the present S&V management intact.

M. J. Leckey, president of S&V, and Walter L. Kitchen, president of the Canadian affiliate, will both remain in those posts.

Emphasizing the similarities in printing-ink technology and coating technology, A-M has expressed hope that research from its many coating activities will accelerate S&V's product improvement program.

But as some inkmakers point out, the problems in both fields are fairly specific and A-M probably won't get a great deal of mileage out of combined research efforts. Chances are that researchers in both A-M and S&V will continue tending their separate gardens, cognizant of—but not equipped to handle—the technical weeds springing up in the other's patch.

Dazzling Dip

Baker & Co. (Newark, N. J.) has developed a dipping process that is said to impart a better-looking, more permanent coat of 24-carat gold to most metals than does electroplating. Called Atomex, the process requires no electric current or special equipment; objects are simply immersed in the bath.

The bath is prepared by mixing 200 cc. of concentrate (containing $\frac{1}{2}$ oz. troy of fine gold) with a gallon of water. Any tank that resists slightly acid or alkaline solution is suitable, says the company. Rate of deposition varies: At 60 C, it takes about three minutes to deposit 1 mg./sq. in. on iron, die-cast metals, steel or soft solder; at 90, it takes 1½ minutes. To

treat copper and some alloys, the bath's pH must be adjusted with ammonia.

The process has been successfully tested on copper and copper-base alloys, cadmium, zinc, nickel, iron, nickel-silver 12%, type metal, steel, soft solder, pewter, Alumel, cobalt and bismuth alloys. Coating up to 0.00001 in. can be applied to most metals.

These advantages are claimed over electroplating: the resulting coating is denser, requires 25% less gold to give the same appearance; there are no high- or low-density areas; bond between metal and coating is stronger; there is no free cyanide or carbonate buildup; all the gold in the bath is used up. And, finally, it's less expensive.

Dodge Inc. (Newark, N. J.), is already using the new process, for gold-plating trophies.

Young Combination

Stepan Chemical bought itself a birthday present this week, celebrated its first quarter-century by acquiring the business and properties of Ninol Laboratories, another Chicago-based outfit (CW Business Newsletter, Aug. 17).

Acquisition of Ninol (for about \$2 million) makes Stepan one of the largest producers of diversified surface-active chemicals in the Midwest, with a growing position in basic chemicals. Ninol's annual sales should boost Stepan's to around \$16 million, according to Alfred C. Stepan, Jr., company president.

By acquiring Ninol, Stepan broadens its product coverage in synthetic detergents, adds agricultural emulsifiers and industrial chemicals, in which Ninol is well established. In addition, Stepan takes a giant step into the export field. Ninol (plant on Calumet Harbor) has long been a shipper of chemicals via the Great Lakes and the St. Lawrence River.

Ninol will operate as a division of Stepan. Jerome Kritchevsky, president of Ninol, joins Stepan as a vice-president and will be general manager of the new division. Theodore Kritchevsky will remain Ninol's research and production vice-president, and Herbert Sanders, director of

The Bio-Chemical Department

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SPECIALTIES

sales at Ninol, will stay on in that capacity for the division. The accent in both organizations is on youth; the Stepan administration group, including the Ninol executives, averages just 42 years of age.

Valve Squabble

Risdon Mfg. Co. (Naugatuck, Conn.) last week filed a complaint in U.S. district court (Connecticut) against Valve Corp. of America (Bridgeport), charging infringement of the patent on the mechanical break-up button used in the former's Micro-Mist aerosol spray nozzle. The nozzle (U.S. Pat. 2,767,023) is designed for aerosol dispensers of liquids using water-based solvents, but Risdon says it's good for other applications, too. One U.S. company and several foreign firms hold Risdon licenses. VCA is holding that none of its customers is to be blamed.

Asleep in the Deep

Latest weapon in marine biologists' arsenal is a water pistol loaded with a salt-water solution of M.S. 222, a "meta-amino-benzoic acid ethyl ester in the form of a methan-sulfonate." The pistol permits marine researchers to anesthetize sharks and rays as they wriggle on a hook or harpoon. The solution, sprayed on the mouth and gills of the fish, will put a 400-lb. shark to sleep in one minute; there's a 5-30 minute period of anesthetization.

The idea, described in *Science* magazine, was worked out by Perry W. Gilbert and F. G. Wood, Jr., of Cornell University and the Marineland Florida Research Laboratory.

Sprayed-on Tarpaulin

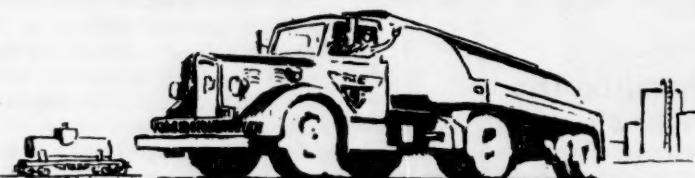
Outdoor storage piles of bulk material can be protected against all types of weather conditions for as long as one year by Johnson-March Corp.'s (Philadelphia) new spray-applied coating.

Called Permaspray, the product is a latex-base material with the consistency of water. It is applied at the rate of 1 gal./100 sq. ft. of surface, dries within 24 hours to a tough, weather- and water-resistant film.

Said to be nontoxic, noncorrosive, Permaspray may be used for coating

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stockpiles of coal, coke (it will not adversely affect their burning), ores, flyash, sulfur, sand, paint pigment—virtually anything in dead storage. Cost: 65¢/gal.

Diagnosis by Tablet

Warner-Chilcott Laboratories (Morris Plains, N. J.) has just come up with a simple, rapid screening test for the detection and diagnosis of a number of diseases, including some forms of cancer, jaundice, and gall stones. Key components of the test—which measures the blood levels of the enzyme, alkaline phosphates—are a reagent tablet (Phosphatab), color developer and a color chart.

The Phosphatab is crushed with a few drops of blood serum, permitted to stand some 12-30 minutes (depending on room temperature). A color developer is then added. Diagnosis is made by comparing color of the serum-reagent mixture with a chart.

The test can be administered for a materials cost of only 31¢. Dr. Paul L. Werner, medical director of Warner-Chilcott, says it "will give the general practitioner an opportunity to test for suspected stones in the common bile duct. Furthermore, it will show up extension of cancer to the liver or pancreas as well as bone cancer."

PRODUCTS

Nonsticky Proposition: Dow Corning Corp. has just introduced two new antiadhesive silicone treatments for paper and paperboard. Identified as Dow Corning 22 (a water emulsion) and Dow Corning 23 (a solvent solution), the products can be applied with conventional equipment to a wide range of paper and paper-like materials, including kraft, parchment, glassine and cellophane.

Dyestuff Series: A new series of fast basic dyes for Orlon and other acrylic fibers has been developed by Geigy Chemical Corp. (Ardsley, N.Y.). Maxilon Blue GLA, which produces deep blues, is said to be more resistant to light fading than any blue yet offered for Orlon. In addition, Geigy has worked out a new dyeing procedure reported to produce extremely level, reproducible shades and greatly minimize the number of redyes needed.

Excerpts From The Chemical Hall of FAME



Paul Sabatier
(1854-1941)

In 1915 Sabatier was awarded the Nobel prize for the numerous hydrogenation experiments which he carried out. Originally interested in physical chemistry, he later had such famous students as Senderens, Mailhe, and Murat.

40 years ago Foremost's El Dorado Division had been experts in coconut oil and its by-products for more than 20 years. Later they turned an equally expert eye on the production of fatty acids and methyl esters.



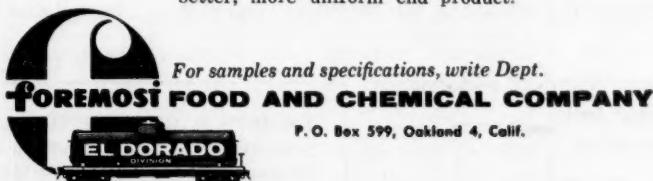
Fatty Acids	Caprylic Coconut	Eldhyco*	Capric Palmitic	Lauric Myristic
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Methyl Esters	Caprylate Coconate	Eldo 18* Myristate	Caprate Caproate	Laurate Palmitate
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The savings came through recommendations for: (1) A completely new bag design. This increased the merchandising value of the Multiwalls. Customer's top executives called it

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Lowering the basis weight enabled customer to cut his Multiwall Bag costs. And, (3) using Union's new "Diamond-O" closure which resulted in greater operating efficiency and a trimmer package.

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Market Newsletter

CHEMICAL WEEK
August 24, 1957

Pressures against raising U.S. tariffs on lead and zinc imports
continue to grow, but opposition tactics occasionally seem to conflict. Last week for example, a delegation representing the International Union of Mine, Mill and Smelter Workers (Canada) demanded "retaliatory action" by Canada if the U.S. imposed rate hikes.

Just a few weeks ago, the influential Metal Mining Assn. (Canada) decried a reported move to increase Canadian tariffs on zinc and zinc items, on the grounds that the U.S. would probably retaliate by boosting its rates on imports. A higher tariff wall could wreak havoc on the Canadian zinc industry, it insisted, since the U.S. is its best customer.

The union delegation that petitioned Prime Minister Diefenbaker and his cabinet in Ottawa insisted that the Canadian zinc industry is already at "a crisis stage," blamed the sharp decline in prices and the threat of a U.S. tariff boost as prime reasons for the current situation.

Canada, said the group, should counteract any U.S. tariff-raising action by putting restrictions on exports to the U.S. of nickel, iron ore, asbestos, and pulp and paper. Further, the union demanded that Canada establish floor prices on lead, zinc and copper; stockpile these metals to make prices effective; strive to expand overseas markets—especially in Britain, France, Germany and Russia.

Meanwhile, some fast-breaking developments in Washington:

On Friday, the Senate Finance Committee voted to boost the tariff on both lead and zinc to a straight 3¢/lb. The committee, however, will seek an approval for the State and Interior Depts. before presenting its decision to the Senate. (Both agencies had originally backed a sliding scale of lead-zinc tariffs.)

Later Friday, Chairman Jere Cooper (D., Tenn.) of the House Ways & Means Committee threw up a formidable roadblock—he served notice that his group would not approve any tariff hike this session, and would probably not go along next year with Administration attempts to "bypass" the Trade Agreements Act with a separate lead-zinc tariff bill.

How dependent is Canada on U. S. chemicals and allied products? A strong indication of the answer is contained in some import statistics just released by the Canadian government. A shade under \$88 million (of a total \$99.9 million) worth of chemicals and related products crossed the border from the U.S. in the first four months of this year. The figure for the comparable period in '56: about \$85 million.

In contrast, shipments from the United Kingdom amounted to some \$7 million (up slightly from '56's \$6.55 million), while imports from sources other than the U.S. or U.K. increased to \$4.92 million from a previous \$4.35 million.

Market Newsletter

(Continued)

Coke-oven toluol prices were chopped 2½¢/gal. this week. The reduction, initiated by Bethlehem Steel, comes as no surprise (*CW Market Newsletter*, Aug. 17)—following the widespread slashing of petrotoluene tags. Price of the latter (at Eastern shipping points) is now 31¢/gal., ½¢/gal. higher than the new coke-oven schedule.

The price cuts are said to be inspired less by competition between coke-oven and petroleum material than by toluene makers' concern over inroads being made by so-called substitute solvents and blended materials. Efforts to regain markets lost to such products may well include further toluene reductions, say some market followers.

Some users of nylon resins will get about a 10% price break next month. Du Pont has just stated that reductions (effective Sept. 16) will apply to all formulations of nylon molding powders. The company's Zytel 101 (a general-purpose powder), for instance, will be reduced 15¢, sell at \$1.18/lb. in truckload quantities.

The new price schedule, says Du Pont, reflects savings made possible "through increased production and advances in technology."

•
Asiatic influenza is influencing U.S. antibiotics output. That's evident from Lederle Laboratories' explanation of why it is doubling antibiotics production. The increase, says the firm, is being made because of the possibility of secondary infections that could stem from Asiatic flu.

Lederle's antibiotics inventory is expected to be 40% higher than normal by Oct. 1. In stock will be a 4½-months' supply of Aureomycin chlortetracycline and Achromycin tetracycline.

•
Several vitamin B-12 products cost less this week. The reductions, posted by Merck's Chemical Division, range up to 15%, are effective immediately. The items, and their new tags; cyanocobalamin U.S.P. (crystalline vitamin B-12), \$215/gram, in bulk; triturations of cyanocobalamin 0.1%, \$247/kilo; cobalamin concentrate for oral preparations, \$175/gram of vitamin B-12 activity.

SELECTED CHEMICAL PRICE CHANGES—Week Ending August 19, 1957

DOWN

	Change	New Price
Potassium stannate, dms., frt. alld. E.	\$0.005	\$0.750
Sodium stannate, dms., wks., frt. alld. E.	0.005	0.603
Tin, crystals, anhyd., dms., wks.	0.007	0.958
Sodium silicofluoride, bgs., wks., c.l.	0.01	0.065
Mercury metal, 76-lb. flask, net flask	2.00	250.00
Toluol, coke-oven, tanks, wks., E., per gal.	0.025	0.2950

All prices quoted per pound unless quantity is given.

DELHI-TAYLOR

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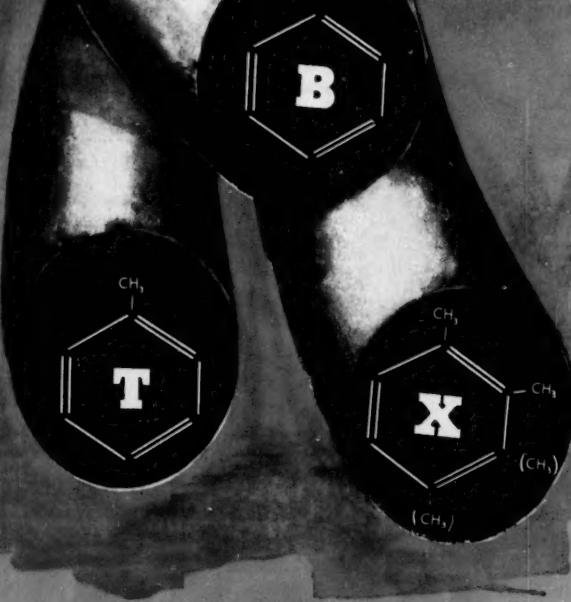
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- *Toluene*
- *Xylene*

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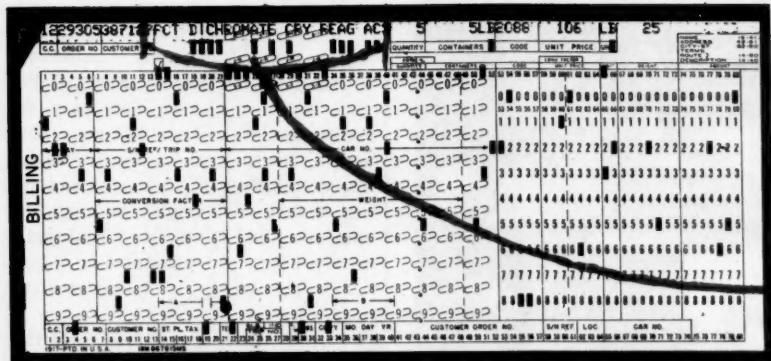
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SALES AND DISTRIBUTION



On punch cards and other mechanized order-handling systems, the limited space allocated for product descriptions poses problems. But the obvious answer—abbreviations—raises problems of its own. That's why ...

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POTASSIUM CHLORIDE CRY TECH
POTASSIUM CHROMATE GRAN ACS
POTASSIUM CHROMATE GRAN PUR
POTASSIUM CITRATE CRY REAG
POTASSIUM CYANATE CRY REAG
POTASSIUM CYANATE PWD PURIF
POTASSIUM CYANIDE GRAN ACS
POT CYANIDE 94-96% GRAN TEC
~~POT DICHROMATE CRY REAG ACS~~
~~POT DICHROMATE GRAN TECH~~
POT FERRICYANIDE CRY RE ACS
POT FERRICYANIDE CRY TECH
POT FERROCYANIDE CRY RE ACS
POT FERROCYANIDE CRY TECH
POT FLUOBORATE CRY TE
POT FLUORIDE GRAN ANHY REAG

Suppliers Push for Standard Definitions

Reagent and fine-chemicals producers are launching a concerted effort this month to solve a growing, troublesome and potentially costly problem. Their target: standardized abbreviations for chemicals nomenclature that can be used in the mechanical sales order processing systems of all producers.

With more and more firms swinging over to mechanical sales order processing methods that impose space limitations on the number of characters that can be used to write product descriptions, the problem is a growing one. It's troublesome, too, because nonchemically trained clerical help—at either the customer or supplier end—sometimes confuse abbreviations, e.g., such items as sulfate and sulfite, nitrite and nitrate.

The problem is potentially costly because long product descriptions can, in some data systems, increase the machine running time upwards of 25%. Depending on the specific equipment, running time can range from \$30 to \$200/hour for computer machinery. On the other hand, it is about \$4/hour for simpler card-type apparatus.

This week, representatives of member firms of the just-formed Manu-

faturing Chemists' Assn.'s Reagent and Fine Chemicals Nomenclature Committee* were pondering three questions discussed at their first meeting—inspired by Allied Chemical. They hope to have answers when they meet again in October.

- Should abbreviations be used all the time or only when space limitations on office forms require them?
- Should the allocation of space on data forms be limited to three character spaces for containers, two for quantity units?
- Should the term "reagent" be dropped from product descriptions that also include the term "ACS"**—since all chemicals of ACS grade are also reagent grade?

To get off to a fast start, member companies will submit to the committee in the next few weeks, a list of the abbreviations they commonly use to describe chemical, container and quantity terms. The lists will not give abbreviations for specific chemicals; rather they will present abbreviations for components, such radicals as car-

*General Chemical Division (Allied Chemical), Mallinckrodt Chemical Works, Merck & Co., Harshaw Chemical Co., J. T. Baker Chemical Co., Fisher Scientific Co. and Distillation Products Industries (Eastman Kodak).

**The term denotes that the chemical meets specifications established by the American Chemical Society.

bonate, sulfate, chloride, etc. The tabulations will be correlated and distributed to members in advance of the October meeting.

Space Barrier: The problem stems directly from the use of mechanical or integrated data systems of processing sales orders. The punch cards used in such setups have only a limited amount of space in which the product description is written out. Allied's General Chemical Division, for example, uses a system in which it is limited to 27 characters, which made necessary preparation of a standard list of abbreviations (*above*). If Allied used a longer product description, some data would be displaced and extra punch cards would be necessary to handle it. That would hike machine running time and costs.

Complicating the problem is the wide variation that exists in spacing needs. While General Chemical uses 27 characters, Merck recently standardized at 20. Eastman Kodak's DPI group uses 41 characters, J. T. Baker is operating with abbreviations scaled to a 30-character line. Not all firms, however, find product descriptions troublesome. DPI's system, for instance, enables it to write complete descriptions, if needed, with little



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Dielectric constant (ASTM D150-47T)	@ 60 cycles	4.34
	@ 1000 cycles	4.33
Power factor (ASTM D150-47T)	@ 60 cycles	0.65%
	@ 1000 cycles	0.05%
Volume resistivity, (ASTM D257-52T)	OHMS-CM	2.4×10^{13}

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SALES

difficulty. The net result is that abbreviations vary; some for example, use the letter R for reagent, others use "REAG." And some spell out the complete name when space is available, others use abbreviations consistently.

Another troublesome aspect is the fact that many companies have already standardized at a particular line length. Devising an approach that will be compatible with systems already in use or that will require a minimum of tampering will not be easy. And that's why no firm can guarantee to adopt all or part of any proposals recommended.

Sales considerations, too, enter the picture. Several firms have spent considerable money and effort to establish trademarks signifying a specific quality grade. Dropping them from sales order terminology would negate, to a certain extent, the promotional efforts.

Understandably, reagent and fine-chemicals firms are supporting efforts to reach a standardized abbreviation nomenclature. With thousands of chemicals in their lines and with data processing becoming more widespread, they reason, the time to prevent abbreviation chaos is now—before it fully develops. To be sure, opinions differ, but if the committee can devise terminology that satisfies customer requirements, data processing limitations and accounting department needs, it will stand a good chance of adoption, will eliminate confusion and save companies costly time on expensive-to-run data processing machines.

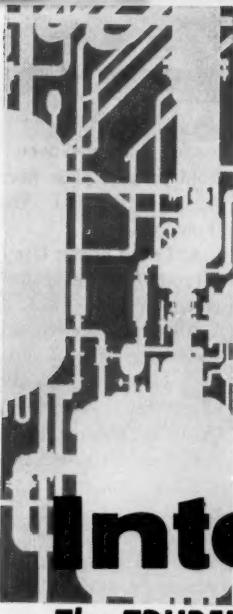
DATA DIGEST

- **Butyl rubber:** Resistance of butyl rubber to solvents and chemicals is presented in detail. Role of fillers, cure state, cure systems and plasticizers on chemical resistance are explained. Thiokol Chemical Corp. (Trenton, N.J.).

- **Pneumatic handling:** A system of unloading granular and pulverized material from freight cars by vacuum is described in illustrated brochure. Sprout, Waldron & Co., Inc. (Muncy, Pa.).

- **Bag fillers:** Folder presents detailed drawing of new automatic, open-mouth, bag-filling machine. Kraft Bag Corp. (New York).

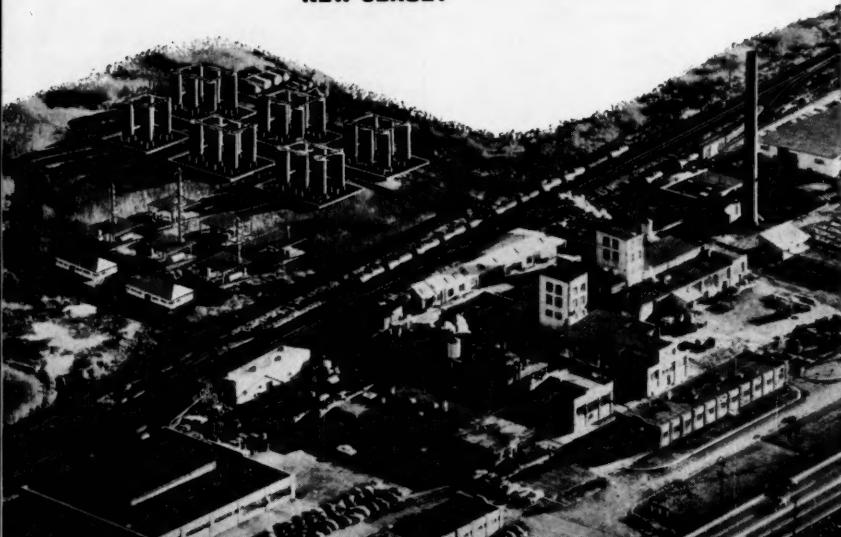
- **Glass roving:** Bulletin outlines



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use of Garan Woven Roving (made from parallel glass fibers) in reinforcing plastics. L.O.F. Glass Fibers Co. (Toledo, O.).

• **Teflon filters:** Use of Teflon tetrafluoroethylene resin in fibrous sheets as a filter is discussed in new bulletin. Applications are suggested for filtration of strong bases and acids, virtually all solvents and petroleum fuels and lubes over a wide temperature range. Du Pont (Wilmington, Del.).

• **Test facilities:** Chemical, metallurgical, quality control and environmental facilities for industrial testing are described in 24-p. brochure. Burgoine Testing Laboratories, Inc. (Westbury, L.I.).

• **Steam-purity tests:** Bulletin compares conductivity methods of steam impurity analysis with that of sodium determination by flame spectrophotometry. Betz Laboratories, Inc. (Philadelphia).

• **Catalog:** Technical reports in the area of packaging and materials handling. The reports (118) are results of federally sponsored projects and captured German documents. Price: 10¢. CTR-72, Office of Technical Service, U. S. Dept. of Commerce (Washington, D. C.).

• **Lithium:** Physical properties and uses of metal and its compounds are concisely summarized in 15-p., pocket-size booklet. Suggested: new applications in ceramics, metallurgy, nucleonics, propellants, electrochemistry and other fields. American Lithium Institute (Princeton, N.J.).

• **Ammonium nitrate:** Booklet gives case histories and economic data for the use of ammonium nitrate as a blasting explosive. Spencer Chemical Co. (Kansas City, Mo.).

• **Biological fouling:** Study reviews biological fouling in recirculating cooling-water systems caused by slime and algae, discusses use of toxic chemicals for control. Betz Laboratories, Inc. (Philadelphia).

• **Plastic laminates:** Air Force report gives data on the thermal properties (specific heats, expansion and conductivity) of several plastic laminates, foam cores and sandwich panels. No. PB 121882, 50¢, Office of Technical Services, U. S. Dept. of Commerce (Washington 25, D.C.).

• **Adhesive chemicals:** Booklet tabulates types of adhesive applications, gives specific formulas for each use. Neville Chemical Co. (Pittsburgh).

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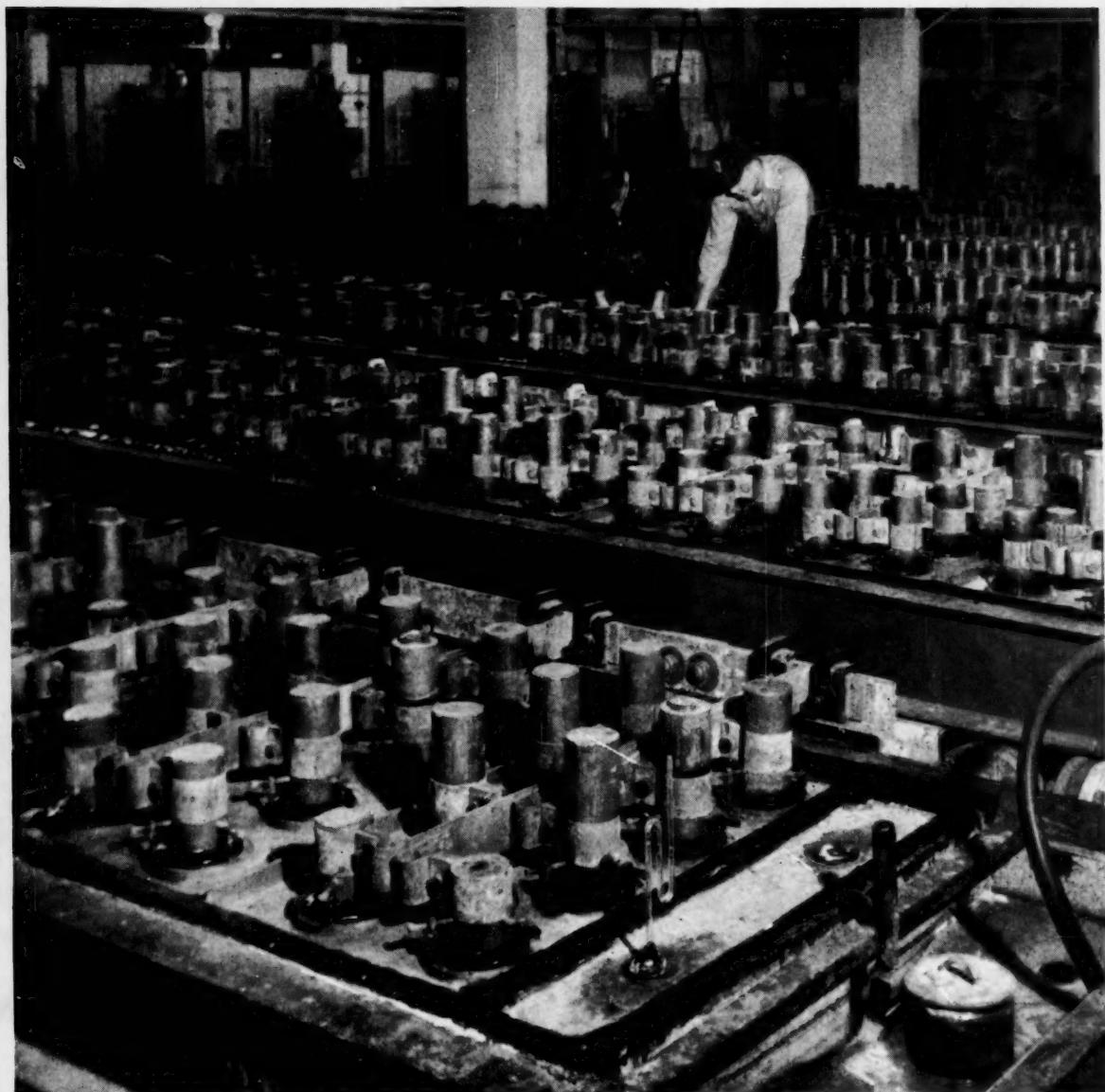
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PRODUCTION



Industrial consultant Allan Mogensen (center) looks over first day's schedule at Work Simplification Conference.

Work Simplification: Old Course Takes New Shape

To the casual observer at the exclusive Lake Placid Club in New York's rugged Adirondacks, industrial consultant Allan H. Mogensen's Work Simplification Conference (which ended last weekend) was no different than it has been for the past 21 years. From Mogensen's first-afternoon introduction of Lillian M. Gilbreth* (above) to the delegates' final-week filming of their solutions of plant production problems, the conference had run its normal six-week course.

But for chemical firms, this year's conference offered a special lesson in how Work Simplification should be

taught. It marked one of the few times that chemical firms were given basic instruction in Work Simplification without the prop of solving a chemical process problem. Although four members of the chemical industry were on hand—two each from Canadian Industries Ltd. (diversified chemical producer) and Canada Packers (makers of soap and detergents)—no chemical projects were selected by the 33 conference delegates for group project solution.

It was accidental rather than by design, and Mogensen and his assistants were not unhappy about it. "We're trying to sell Work Simplification, not solutions of specific problems," he said. "Delegates often want

*Engineer, psychologist and consultant, author of the best-seller "Cheaper by the Dozen."



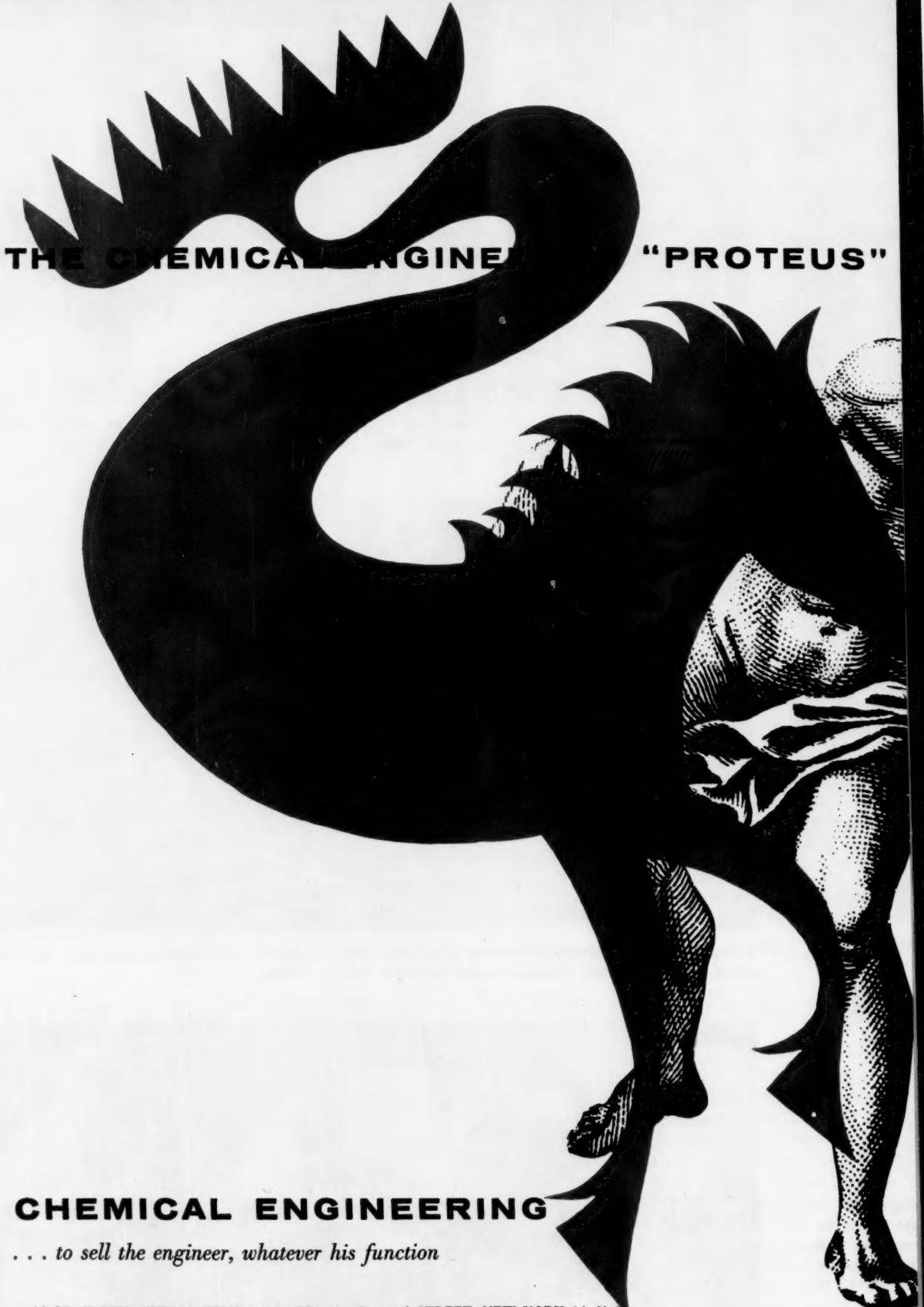
'Which light do you have on?' asks Mogensen. Traffic-light sweater and ball with green and red halves represent open or closed mind. It won't work! gets a red signal.



Delegates split into groups for solving plant production problems, pick major project from one submitted by each member. Group solutions receive wider acceptance.



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important tool.
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film record to
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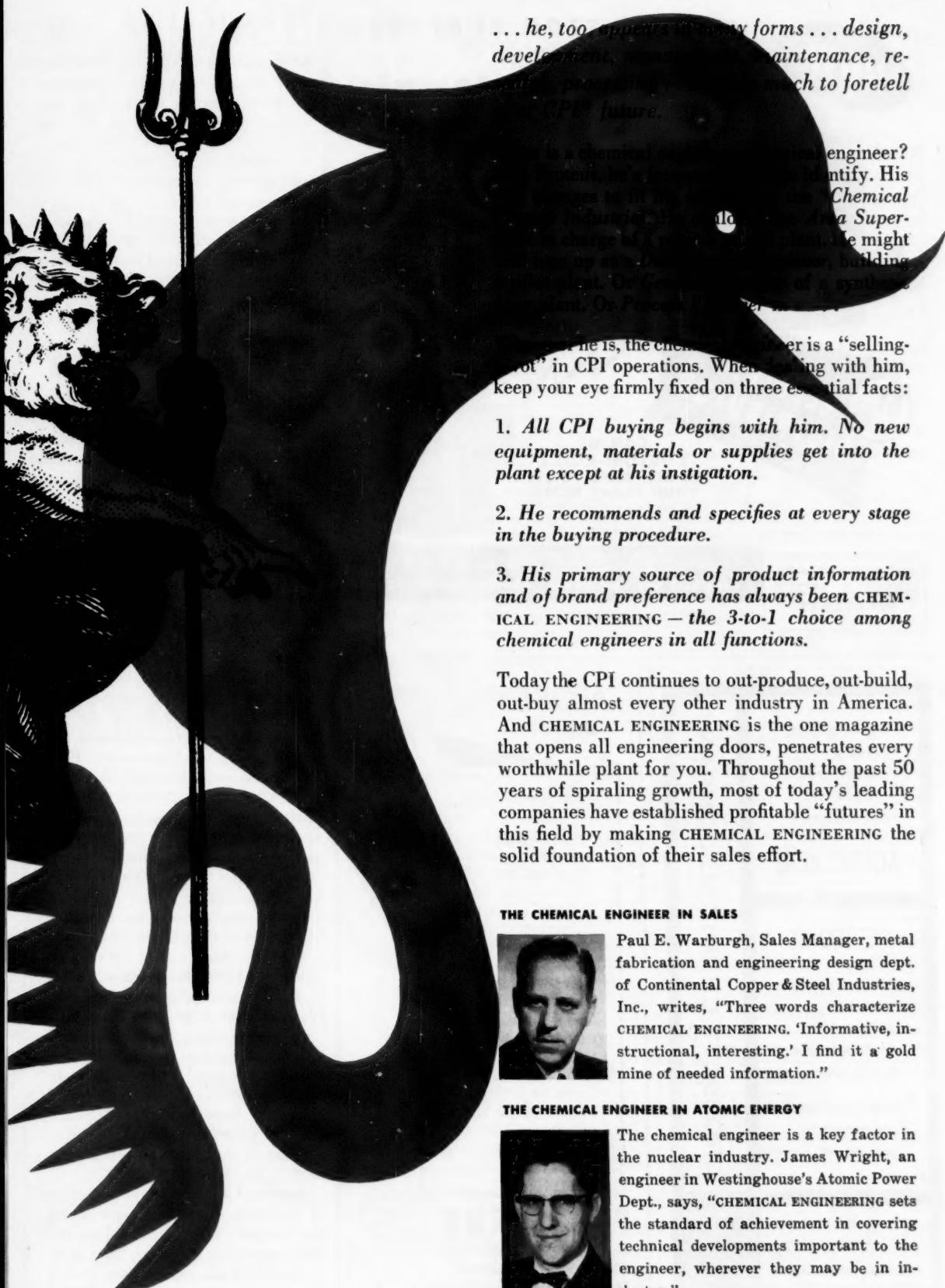
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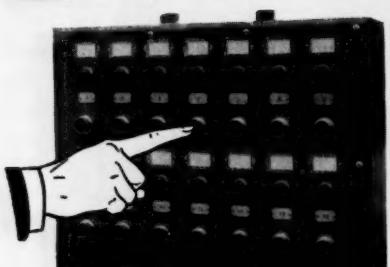
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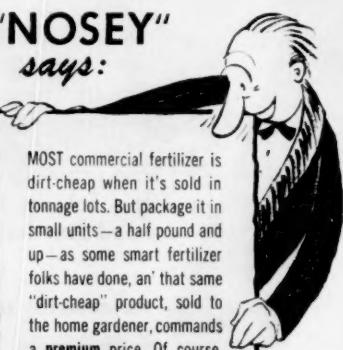
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PRODUCTION

to work on their own specific projects," he continued. "Then, when they get home, they try to sell Work Simplification on the basis of that one project. Human nature being what it is, a solution that has been worked out with the help of outsiders is often the toughest one to sell.

"When some chemical firms come up here for the first time, they are a bit apprehensive, feel that the course may offer more to industries with strictly mechanical processes. But we try to teach the basic principles—and actually, some of the biggest savings through Work Simplification have been realized by chemical firms."

More than 20 chemical firms have been represented at his conferences. Several that have set up active plant programs are frequent attenders, though few are so keenly interested as CIL, which sent delegates for the ninth time this year.

Value Plus: Work Simplification is a form of industrial engineering; but it has a plus: everyone in the plant may participate. Although some firms have restricted it to the supervisory level, others have given Work Simplification instruction to plant operators. For example, Du Pont, whose association with Mogensen goes back to 1933 (four years before the first Lake Placid conference), has a record of using both approaches. Food Machinery and Chemical's Westvaco Mineral Products Division plant at Carteret, N. J., has included all salaried and many hourly employees in its program, realizes annual savings that average between \$20,000 and \$40,000, according to Ray Reul, staff industrial engineer for the Chemical Division. And GE's Chemical Division at Pittsfield, Mass., came up with an estimated \$100,000 worth of ideas from 100 employees after its first year's program (*CW*, May 16, '53).

In recent years, Mogensen's staff has stressed group solutions of production problems rather than individual solutions. Advantages: more ideas and better morale. It's much easier to get plant workers to agree to a change if they know they helped to think it up in the first place.

Training Ground: One of the values of Mogensen's course is in teaching the delegates how to pass along the basic principles to others. The principles are simple and timeless: pick a job to improve; make a chart of the

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But teaching others, instilling the proper spirit, right up to top management, is more difficult. Mogensen's own course is a prime example of this spirit. It has maintained its verve over the years, just as a plant Work Simplification program must, if it is to be successful.

An important facet of Mogensen's program is guidance in conference leadership, public speaking and the little tricks of visual aids. Everyone gets many chances, receives candid analysis and help. As 1950-alumnus Ray Reul recalls: "Before going to Lake Placid, I had never talked before a group of more than five persons. Since then, I've led two-day 'blitz' training sessions in Work Simplification for all kinds and sizes of groups—from plant personnel to top management. And outside the com-

pany, I've spoken to and have been the chairman of groups numbering in the hundreds."

And training in the human factors of Work Simplification and industrial management gets a big play. Mogensen calls on guest speakers who are recognized experts in their fields, makes their services available for several days at training sessions and informal group discussions.

Some firms consider the course even more valuable as a management training ground. But in the long run, it should prove helpful in spreading Work Simplification ideas. For it means that management is gaining men who are sympathetic to Work Simplification: "Now, firms know who to send. In the early days, executives often showed up at the conferences."

Now, Mogensen runs a two-week short course at Sea Island, Ga., each winter for executives who are interested only in the top picture.

CHEMICAL WEEK • ADVERTISERS INDEX

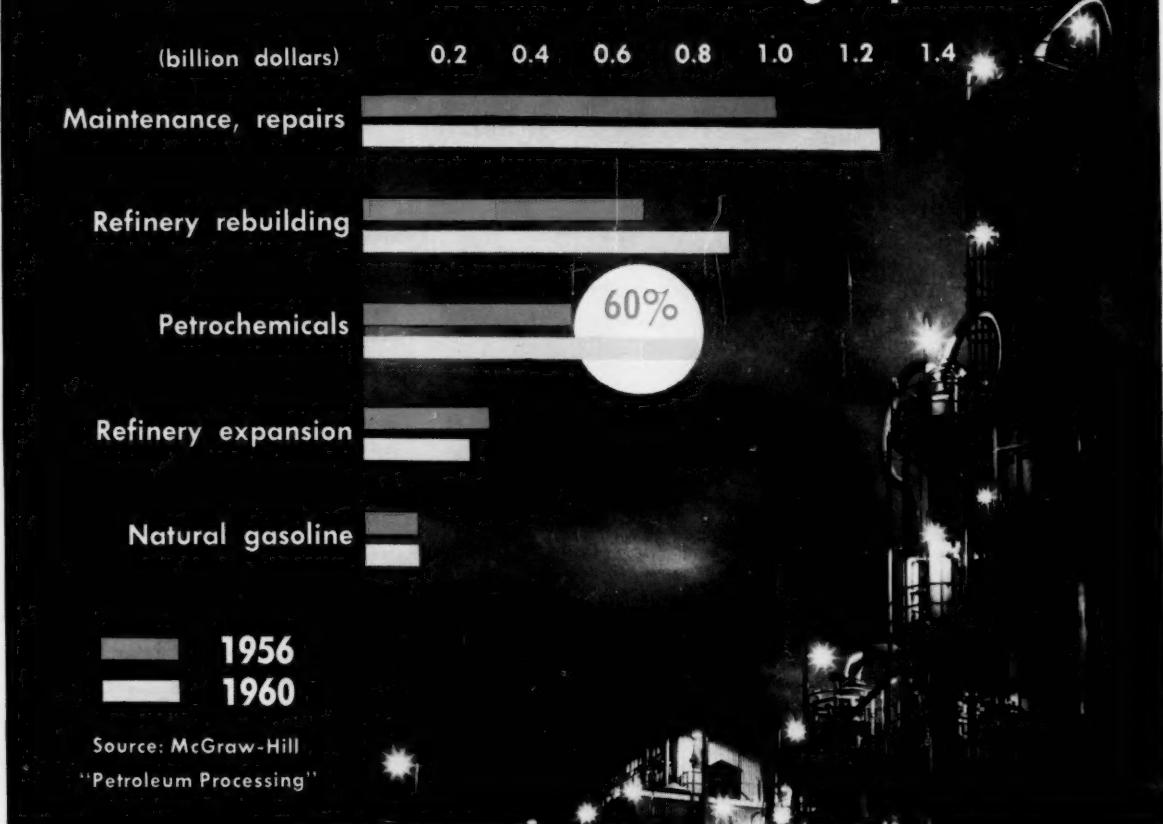
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Agency—G. M. Basford Co.		Agency—Ridgway Adv. Co.		Agency—Molesworth Assoc.	
AMERICAN MINERAL SPIRITS CO.	33	HALL CO. THE C. P.	15	WALLACE & TIERNAN INC.	52
Agency—Leo Burnett Co.		Agency—Cruttenen Adv.		Agency—Branstater Assoc. Inc.	
ARMOUR LABORATORIES, THE	62	HARSHAW CHEMICAL CO. THE	10	WILLIAMS & CO. C. K.	38
Agency—Jordan-Sieber & Corbett, Inc.		Agency—The Roland G. E. Ulman Organization, Inc.		Agency—William A. Hatch, Inc.	
BERKSHIRE CHEMICALS INC.	13	HAVEG INDUSTRIES, INC.	40	WITCO CHEMICAL CO.	4th Cover
Agency—Molesworth Assoc.		Agency—The Roland G. E. Ulman Organization, Inc.		Agency—Hazard Adv. Co.	
BLOCKSON CHEMICAL CO.	68	HAVAS INTERNATIONAL SERVICE	46	WYANDOTTE CHEMICAL CORP.	39
Agency—Wm. Balsam Adv.		Agency—William E. Jary Co. Adv.		Agency—Brooke, Smith, Freney & Dorrance Inc.	
CARRIER-STEVENS CO.	48	HERCULES POWDER CO.	24	tracers SECTION	
		Agency—Fuller & Smith & Ross Inc.		(Classified Advertising)	
CELANESE CORP. OF AMERICA	14	LINDE CO DIV. OF UNION CARBIDE CORP.	2	F. J. Eberle, Business Mgr.	
Agency—Ellington & Co., Inc.		Agency—J. M. Mathes, Inc.		CHEMICALS: Offered/Wanted	80
CHEMICAL & INDUSTRIAL CORP.	16	MATLACK INC. E. BROOKE	11	EMPLOYMENT	80
Agency—Strauchen & McKim Adv.		Agency—A. E. Aldridge Assoc.		EQUIPMENT: Used/Surplus New For Sale	79
CHEMICAL SOLVENTS INC. THE C. P.	62	MERCK & CO. INC.	46	WANTED	79
		Agency—Charles W. Hoyt Co. Inc.		MANAGEMENT SERVICES	80
CONSOLIDATED CHEMICAL INDUSTRIES, INC.	36	MICHIGAN CHEMICAL CORP.	6	SPECIAL SERVICES	79
Agency—Brennan, McGary, Robinson Inc.		Agency—Wesley Aves. & Assoc.			
CONTINENTAL CAN CO.	60	MONSANTO CHEMICAL CO.	73		
Agency—Batten, Barton, Durstine & Osborn Inc.		Agency—Gardner Adv. Co.			
CONTINENTAL OIL CO.	44	NATIONAL ALUMINATE CORP.	34		
Agency—Benton & Bowles, Inc.		Agency—Armstrong Adv. Agency			
CROSSETT CHEMICAL CO.	78	OLIN MATHIESON CHEMICAL CORP.	2nd Cover		
Agency—Dan Goodrich, Adv.		Agency—Doyle, Kitchen & McCormick Inc.			
DAVENPORT MACHINE & FOUNDRY CO.	70	PACIFIC CARBIDE & ALLOYS CO.	49	ADVERTISING STAFF	
Agency—Bawden Bros. Inc.		Agency—Ross C. Marble Adv.			
DELHI-TAYLOR OIL CORP.	67	PENNsalt CHEMICAL CORP.	5	Atlanta 3	Robert H. Powell
Agency—Sam J. Gallay Adv.		Agency—Sommers Davis, Inc.		1301 Rhodes-Haverty Bldg., Jackson 3-6951	
DODGE & OLcott, INC.	30	PETRO-TEX CHEMICAL CORP.	41	Boston 16	350 Park Square Building, Paul F. McPherson, Hubbard 2-7160
Agency—Caleon Corp.		Agency—James J. McMahon Inc.			
DU PONT de Nemours Inc. E. I. ORGANIC CHEMICALS DIV.	1	RHODIA INC.	72	Chicago 11	Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., Mohawk 4-5800
Agency—N. W. Ayer & Son, Inc.		Agency—The House of J. Hayden Twiss			
DORR-OLIVER INC.	32	ROHM & HAAS CO.	9	Cleveland 15	Vaughn K. Dissette, 1510 Hanna Bldg., Superior 1-7000
Agency—Sutherland-Abbott Inc.		Agency—Arndt, Preston, Chapin, Lamb & Keen Inc.			
DUREZ PLASTICS DIV. HOOKER ELECTRO-CHEMICAL CO.	55	RUBBER CORP. OF AMERICA	70	Dallas 1	George Miller, The Vaughn Bldg., 1712 Commerce St., Riverside 7-5117
Agency—Comstock & Co.		Agency—Ovesey & Straus Inc.			
EL DORADO DIV. FOREMOST FOOD & CHEMICAL CORP.	63	SHELL CHEMICAL CORP.	47	Denver 2	John W. Patten, 1740 Broadway, Alpine 5-2981
Agency—Slaney, Garfield & Assoc.		Agency—J. Walter Thompson Co.			
EMULSOL CHEMICAL CORP.	23	STONE & WEBSTER ENGINEERING CORP.	27	Detroit 26	876 Penobscot Bldg., H. J. Sweger, Jr., Woodward 2-1798
Agency—Grossfeld & Staff, Adv.		Agency—Harold Cabot & Co. Inc.			
ETHYL CORP.	19	STANDARD OIL CO.	53	London	H. Lagler, McGraw-Hill House, 95 Farringdon St., E.C. 4, England
Agency—H. B. Humphrey, Alley & Richardson		Agency—D'Arcy Adv. Co.			
FMC ORGANIC CHEMICALS DIV., FOOD MACHINERY & CHEMICAL CORP.	31	SUN OIL CO.	50	Los Angeles 17	John B. Uphoff, 1125 West Sixth St., Madison 6-8851
Agency—The McCarty Co. Adv. Inc.		Agency—Buthrauff & Ryan, Inc.			
FRITZSCHE BROTHERS INC.	78	TRUBEN LABORATORIES INC.	71	New York 36	Knox Armstrong, P. F. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., Oxford 5-5959
Agency—Callon Adv. Corp.		Agency—Ray Ellis, Adv.			
FRONTIER CHEMICAL CO.	72	UNION BAG-CAMP PAPER CORP.	64	Philadelphia 3	William B. Hannum, Jr., Architects Bldg., 17th & Sansom Sts., Rittenhouse 6-0670
Agency—The McCormick-Armstrong Co.		Agency—Smith, Hagel & Knudsen, Inc.			
GENERAL AMERICAN TRANSPORTATION CORP. AIRSLIDE CARS DIV.	4	UNION CARBIDE CHEMICALS CO. DIV. OF UNION CARBIDE CORP.	28	Pittsburgh 22	V. K. Dissette, Room 919 Oliver Bldg., Atlantic 1-4707
Agency—Edward H. Weiss & Co.		Agency—J. M. Mathes, Inc.			
GENERAL CHEMICAL DIV. OF ALLIED CHEM & DYE CORP.	3rd Cover	U. S. RUBBER CO.	36	San Francisco 4	William C. Woolston, 68 Post St., Douglas 2-4600
Agency—Atherton & Currier, Inc.		Agency—Fletcher D. Richards, Inc.			

CHARTING BUSINESS

AUGUST 24, 1957

Petroleum Processing Expenditures



Petrochemicals: Bound for Biggest Boost

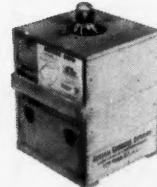
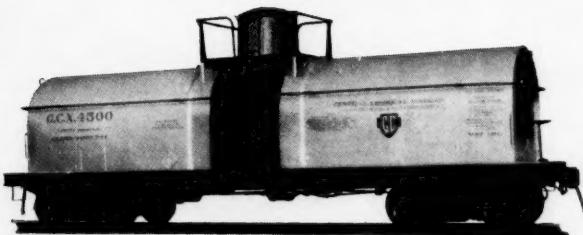
In 1960, the petroleum industry is expected to put a whacking \$3.3 billion into capital expenditures. This is a 27% increase over the '56 outlay of \$2.6 billion, reflects the industry's surging growth.

Expenditures for petrochemical facilities will show the greatest gain of any category (*see chart*). Outlay will be \$800 million in '60, compared with \$500 million last year.

What's behind this staggering 60% hike? Petrochemical demand has been increasing at a rapid rate, with no slack-off in sight. By '60, more than 40% (about 60

million lbs.) of all chemicals produced will come from petroleum. Today, petrochemicals comprise more than 25% of total chemical output.

Predicted petrochemical breakdown for '60: aliphatics, 40 million lbs.; inorganics, 15 million lbs.; aromatics, 5 million lbs. Big growth factor in the petrochemical picture; plastics, which now take about 15% of petrochemical production. Other important outlets: synthetic rubber (20%), automotive, aviation uses (20%), synthetic fibers (16%). Fertilizers, synthetic detergents are also big petrochemical consumers.



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Reagent, Sp. Gr. 1.59-1.60

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Technical, 97.5% HNO_3 (with or without HF inhibitor)
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BATCH CONTROL ANALYSIS
 (Please attach to batch record)

Batch

Date	Product	Preliminary	Batch	Final
Test				
Aluminum				
Barium				
Lead				
Lithium				
Lithium Hydroxy				
Calcium				
Magnesium				
Sodium				
Cadmium				
Zinc				
% Metal				
Color				
Clarity				
Acid No.				
Sp gr.				
Moisture				
Ash				
Acetone extr.				
Fineness				
Sedimentation				
Soft. pt.				
Bulking				
Flash				
% Reactive				

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